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COMMISSION ON SCIENCE AND TECHNOLOGY
FOR DEVELOPMENT
Fourth session
Geneva, 17 May 1999
Item 1 of the provisional agenda

ADOPTION OF THE AGENDA AND OTHER ORGANIZATIONAL MATTERS

Provisional agenda

1. Adoption of the agenda and other organizational matters
2. Substantive theme: "Science and technology partnerships and networking for national capacity-building"
3. Panel on Biotechnology
4. Common vision on the future of science and technology for development
5. Budget and inter-sessional activities of the Commission
6. Coalition of resources
7. Action arising from the third session
8. Role and activities of the Commission regarding the coordination of science and technology for development
9. Election of the Chairperson and other officers for the fifth session of the Commission
10. Provisional agenda and organization of work of the fifth session of the Commission
11. Other matters
12. Adoption of the report of the Commission on its fourth session.

GE.99-50963

Annotations

Item 1. Adoption of the agenda and other organizational matters

1. The provisional agenda and the documentation for the fourth session of the Commission were approved by the Economic and Social Council (ECOSOC) at its 1997 substantive session in decision 1997/306.

2. It might be recalled that, pursuant to ECOSOC resolutions 1998/46 and 1998/47, the current membership of the Commission was elected on 16 December 1998 and on 5 February 1999. At the time of the preparation of the annotated agenda, the Chairperson of the CSTD and one Vice-Chairperson from the Asian Group had not yet been elected. The following Vice-Chairpersons of the Commission for the fourth session were elected by acclamation on 22 February 1999:

Vice-Chairpersons : Mr. Bernd Michael Rode (Austria)
Mr. Arnoldo Ventura (Jamaica)
Ms. Rolanda Predecsu (Romania)

3. As at previous sessions of the Commission, one of the Vice-Chairpersons should also serve as Rapporteur.

Item 2. Substantive theme: Science and technology partnerships and networking for national capacity-building

4. The Economic and Social Council, under section E, paragraph 12, of its resolution 1997/62, decided that the main substantive theme of the Commission for its inter-sessional period 1997-1999 would be "Science and technology partnerships and networking for national capacity-building." The theme would include North-South as well as South-South partnerships and networks involving, *inter alia*, enterprises, educational bodies, research institutions, governmental science and technology departments, and other actors in the field of science and technology, with particular attention to be paid to biotechnology and energy.

Documentation

Report by the secretariat synthesizing the work of the Working Group on Science and Technology Partnerships and Networking for National Capacity-Building (E/CN.16/1999/2)

Item 3. Panel on Biotechnology

5. Under section E, paragraph 13, of its resolution 1997/62, ECOSOC also decided to hold a panel meeting on biotechnology and its impact on development. This meeting would bring together country experts and experts from relevant institutions and United Nations agencies working on that subject, in order to identify critical issues relevant to development that are not sufficiently covered by existing forums, with particular attention to food production, and in order to recommend how further work on those issues might be undertaken.

Documentation

Note by the secretariat reporting on the CSTD Panel on Biotechnology for Food Production and its Impact on Development (E/CN.16/1999/3)

Item 4. Common vision on the future of science and technology for development

6. Under Section C, paragraph 10, of its resolution 1997/62, ECOSOC recommended that the Commission, in the form of expert group meetings, carry out a programme of preparation as outlined in the report of the meeting of the preparatory working group on that subject, held on 20 and 21 December 1996 in Geneva,[1] taking into account regional inputs.

Documentation

Report by the secretariat presenting the Vision Statement of the Working Group on a Common Vision for the Future Contribution of Science and Technology for Development (E/CN.16/1999/4)

Item 5. Budget and inter-sessional activities of the Commission

7. Under Section F, paragraph 14, of its resolution 1997/62, ECOSOC recommended that at future sessions of the Commission, the report on the budget and inter-sessional activities of the Commission be considered under a separate agenda item.

Documentation

Note by the secretariat on the budget and inter-sessional activities of the Commission (E/CN.16/1999/5)

Item 6: Coalition of resources

8. Under section H, paragraph 17, of its resolution 1997/62, ECOSOC recommended that a workshop be convened by the Commission to provide a forum for the coalition of resources, particularly in relation to information and communication technologies.

Documentation

Note by the secretariat on the Workshop on Coalition of Resources (E/CN.16/1999/6)

Item 7. Action arising from the third session

9. At its third session, the Commission dealt with two main themes, namely: (i) Information and communication technologies for development;[2] and (ii) Science, technology and innovation policy reviews.[3]

10. Under Section A of its resolution 1997/62, ECOSOC recommended that all developing countries and countries with economies in transition establish a national strategy for information and communication technologies, taking

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[1] See E/CN.16/1997/CRP.2.

[2] See E/CN.16/1997/4.

[3] See E/CN.16/1997/5.

into account, *inter alia*, the guidelines proposed by the Working Group on Information and Communication Technologies for Development of the Commission on Science and Technology for Development, and that where such strategies already exist, they be reviewed in the light of those guidelines.

11. The Council further recommended that action be taken by national Governments to establish a task force or commission, or to ensure that an existing entity be charged with the design of the national strategy for information and communication technologies.

12. The Council also invited countries, in order to facilitate the exchange of experience among them at the international and regional levels, to prepare a report on their strategies for information and communication technologies for the next session of the Commission, to be held in 1999, and stressed that the reports include the priorities of each national strategy, the mechanisms for updating, and the procedures for implementing the strategy and that, to enhance the value of the reports, consideration might be given to the organization of workshops, all of which should be financed from extrabudgetary resources.

13. The Council further invited relevant bodies of the United Nations system to assess their capability to provide assistance and promote cooperation in the area of information and communication technologies and to suggest areas in which they are best able to assist developing countries and countries with economies in transition in the design and implementation of their national strategies for information and communication technologies.

14. The Council requested the secretariat of the Commission to synthesize the results of those assessments and to hold an inter-agency meeting within existing resources in cooperation with the Commission to review that synthesis.

15. The Council invited Governments, the public and business sectors, academia and non-governmental organizations in industrialized countries to engage in technological cooperation activities with their counterparts in developing countries and countries with economies in transition in order to facilitate their access to and encourage the use, production and development of information and communication technologies and to ensure their effective participation in building the global information infrastructure.

16. Finally, the Council requested the Commission to identify an independent institute to prepare a study, subject to the availability of extrabudgetary resources, for the next session of the Commission on new forms of resource generation, focusing on information and communication technologies that might support social and economic development priorities.

17. With regard to science, technology and innovation policy reviews, the Council, under Section B, paragraphs 8 and 9, of its resolution 1997/62, decided that the Commission should organize a workshop comparing experience in science, technology and innovation policy or similar reviews in developing countries and countries with economies in transition in order to stimulate a learning process in those innovative efforts, subject to the availability of extrabudgetary resources.

18. The Council further recommended the continuation of cooperation between the Commission and the United Nations Conference of Trade and Development on science, technology and information policy reviews.

19. With regard to the Gender Advisory Board, the Council, under Section D, paragraph 11, of its resolution 1997/62, requested the Gender Advisory Board to continue its work as reported, in collaboration with all relevant

organizations, in particular those within the United Nations system.

Documentation

Comprehensive note on the implementation of and progress made on decisions taken at the third session, including follow-up work on information communication technologies and science, technology and innovation policy reviews (E/CN.16/1999/7)

Item 8. Role and activities of the Commission regarding the coordination of science and technology for development

20. Under section G, paragraphs 15 and 16, of its resolution 1997/62, ECOSOC decided that the secretariat of the Commission be requested to study the possibility of setting up, in collaboration with other United Nations bodies, including regional commissions, an electronic network on their activities in science and technology for development, making that network widely accessible to science and technology institutes around the world.

21. It also decided that, in order to promote better interaction with United Nations bodies, especially the regional commissions, the Commission should give consideration to including suitably qualified members of those bodies in the working groups of the Commission. In addition, meetings of the Commission's working groups might be held in the offices of the regional commissions, whenever possible.

Documentation

Note by the secretariat on the role and activities of the Commission regarding the coordination of science and technology for development (E/CN.16/1999/8)

Item 9. Election of the Chairperson and other officers for the fifth session of the Commission

22. The Commission may wish to follow the practice adopted at its previous sessions of electing a Chairperson and four Vice-Chairpersons for its fifth session. It is understood that one of the Vice-Chairpersons would also serve as Rapporteur.

Item 10. Provisional agenda and organization of work of the fifth session of the Commission

23. The Commission will have before it a note by the secretariat on the provisional agenda for its fifth session, the documents to be submitted under each item and the organization of its work.

Item 11. Other matters

Item 12. Adoption of the report of the Commission on its fourth session

24. In accordance with General Assembly resolution 46/235 and Economic and Social Council decision 1992/218, the Commission on Science and Technology for Development submits its report to the Council.

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Item 1 of the provisional agenda

ADOPTION OF THE AGENDA AND OTHER ORGANIZATIONAL MATTERS

Organization of work of the session

Note by the secretariat

1. The draft organization of work for the fourth session of the Commission on Science and Technology for Development, annexed to the present note, has been prepared to facilitate the consideration of agenda items within the time-frame available and in accordance with the conference services allocated to the Commission.

2. The draft is based on the provisional agenda for the current session, which was adopted by the Commission at its third session and approved by the Economic and Social Council at its 1997 substantive session in decision 1997/306. The provisional agenda is circulated under E/CN.16/1999/1.

3. The time-table below should be considered indicative. Should the Commission complete the general discussion on an item before the date shown, it might wish to move immediately to the next item.

4. The Commission is scheduled to meet from Monday to Friday, 17 to 21 May 1999. Arrangements have been made to hold morning and afternoon meetings during the session. The morning meetings will be held from 10 a.m. to 1 p.m. and the afternoon meetings from 3 p.m. to 6 p.m.

GE.99-50956

Annex 1

PROPOSED ORGANIZATION OF WORK

The proposed organization of work for the fourth session of the Commission on Science and Technology for Development is as follows:

Monday, 17 May

a.m.	Item 1	Adoption of the agenda and other organizational matters
	Item 2	Substantive theme: Science and technology partnerships and networking for national capacity-building
		- *Introduction and general discussion*
p.m.	Item 2	Substantive theme: Science and technology partnerships and networking for national capacity-building- *Conclusion of general discussion*
		- *Informal consultations*

Tuesday, 18 May

a.m.	Item 3	Panel on Biotechnology
		- *Introduction and general discussion* - *Informal consultations*
p.m.	Item 4	Common vision on the future of science and technology for development
		- *Introduction and general discussion* - *Informal consultations*

Wednesday, 19 May

a.m.	Item 5	Budget and inter-sessional activities of the Commission
		- *Introduction and general discussion* - *Informal consultations*
	Item 6	Coalition of resources
		- *Introduction and general discussion* - *Informal consultations*
	Item 7	Action arising from the third session - *Introduction and general discussion* - *Informal consultations*

p.m. Item 8 — Role and activities of the Commission regarding the coordination of science and technology for development

- Introduction and general discussion
- *Informal consultations*

Thursday, 20 May

a.m. Item 9 — Election of the Chairperson and other officers for the fifth session of the Commission

- *Introduction and general discussion*
- *Informal consultations*

p.m. Item 10 — Provisional agenda and organization of work of the fifth session of the Commission

- *Introduction and general discussion*
- *Informal consultations*

Friday, 21 May

a.m. Item 11 — Informal consultations on all pending matters

p.m. Item 12 — Adoption of the report of the Commission on its fourth session

- *Closing of the session*

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COMMISSION ON SCIENCE AND TECHNOLOGY
FOR DEVELOPMENT
Fourth session
Geneva, 17 May 1999

Working Group on Science and Technology

Partnerships and Networking for National Capacity-Building

Report by the UNCTAD secretariat

GE.99-51020

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Executive summary

1. Since the late 1980s, the world economy has been undergoing fundamental changes driven by the rapid globalization of economic, scientific and technological activities and characterized by the emergence of knowledge-based industries. The emergence of knowledge-based industries and the globalization of the world economy are closely interlinked: globalization has brought with it a more intense competitive environment and new requirements for sustained competitiveness. This new competitive environment has fuelled the growth of knowledge-intensive production by increasing scientific and technological interactions, which, in turn, have led to an acceleration in the pace at which new ideas are generated. The need for innovation and the active search for continuous measurable improvements have created an urgent necessity to adjust policies and practices at both the firm and government levels.

2. Globalization has also brought with it new challenges: those without access to knowledge cannot compete globally, and fall even further behind. To face up to the challenges of this new and highly competitive environment, new forms of inter-firm cooperation, including networking and partnering, have evolved. Such interactions have over the past few years become a more and more popular way of conducting business and transfering technology, and the basis for local capacity-building in many countries.

3. These developments, however, have until very recently been largely confined to firms in the developed countries and, increasingly, in the newly industrialized countries (NICs) in Asia and Latin America. Firm-level studies in a wide variety of developing countries show that many firms from East and South-East Asia have succeeded in making large strides in high-technology sectors not only by investing heavily in both human and physical resources but also by forming partnerships with more technologically advanced firms from the North. Anecdotal evidence from success stories in those countries suggests that partnerships have helped firms in those countries to build the technological capabilities and skills needed to penetrate international markets. Given that the process of partnerships and networking relates to the continuing debate on appropriate policies for economic integration and growth in an increasingly global and knowledge-based economy, the recent upsurge in these inter-firm interactions deserves the attention of policy makers and calls for greater analysis of the dynamics and implications of this process at both the national and international levels.

4. It is in this context that the United Nations Commission on Science and Technology for Development (CSTD) decided to focus during the inter-sessional period 1997-1999 on the theme of "science and technology partnerships and networking for national capacity-building". Its Working Group on Science and Technology Partnerships and Networking for National Capacity-Building met in Malta from 28 to 30 September 1998 and addressed a number of important questions related to the process of partnerships and networking, particularly in the developing countries and countries in transition. The Working Group discussed the extent to which these developments have opened up new opportunities for developing countries and countries in transition to build up indigenous capacity and technological capability, especially at the enterprise level. The Working Group also looked at whether the success of NICs in forging alliances and partnerships and in using them to enhance technological upgrading and improving competitiveness can be replicated in other countries. Participants also discussed the question of whether partnerships and networking could be regarded by policy makers and business leaders, particularly in developing countries, as a vehicle to facilitate their efforts to access capital, technology and know-how: Under what conditions do they present opportunities and constraints for firms in developing countries and economies in transition? To what extent do they contribute positively to economic development more broadly? And, finally, if

indeed there are positive elements in the process of networking and partnering, what might national Governments and the international community do to promote this process?

5. The Working Group focused in particular on partnerships and networking in energy and biotechnology, two very important industries vital to economic growth and development in developing countries. In this respect, the Working Group addressed the policy options and practical measures needed to promote technology partnerships and networking for national capacity-building in developing countries and in countries in transition. The Working Group discussed the role of Governments, the United Nations system and non-governmental organizations (NGOs) in promoting the kind of partnerships which foster innovation, sustain competitiveness and enhance the participation of firms from developing countries and economies in transition in the global economy. Experts considered policy instruments to enhance North-South joint business opportunities by facilitating industrial partnerships based on technology transfer and exchange, and joint research partnerships, and by drawing policy lessons from developed countries' experience in technological upgrading.

6. There was overall agreement that, when formed prudently, partnerships and networking could be effective mechanisms for technological development, national capacity-building and market access across a large number of industries. They could assist in the development of competitive indigenous industry and in the mobilization of the necessary resources and technological expertise to upgrade lagging infrastructure. They could also be vehicles, particularly for small and medium-sized enterprises (SMEs), to learn new business and management cultures and to access international markets. They could also provide firms and research institutions from developing countries and countries in transition with opportunities to leverage their own research and development (R&D) activities and enable them to build the credibility necessary to attract the attention of potential partners abroad. However, it was stressed that partnerships and networking, while important, could not be expected to be a panacea for all the problems on the road to economic development. It was also noted that neither the benefits nor the attempts to build successful partnerships were always assured. Much depends on the objectives of the partners and the level of their competence as well as on the macroeconomic and policy environment where the partnership takes place.

7. There was overall recognition that developing countries and countries in transition continue to face certain constraints in their efforts to advance in technology transfer and cooperation, since they lack financial resources and have limited human and institutional capacities. There was agreement that Governments have a crucial role to play in fostering networks and partnerships. The creation of an enabling macroeconomic and policy environment that includes an appropriate legal and regulatory framework, support mechanisms and incentives is vital for inter-firm cooperation. There was also agreement that education, information and basic research have to be a central task of the State. It is also very important that Governments provide support for the development of an adequate infrastructure that helps the continuity of partnerships.

8. The meeting illustrated the close linkages between technology policy issues and the export performance of developing countries. Specific actions are needed from developed countries and from international organizations to support the efforts of developing countries to acquire the technologies, know-how, human resources and institutional structure that would foster their export growth and enable them to "leapfrog" to the path of sustainable development. Experts emphasized the need to improve access to information on R&D and to analyse the impact of networks on the globalization of research and on enhancing innovation potential and technological policies in developing countries and in countries in transition. It was recognized that additional

work needed to be done to develop guidelines and case studies based on lessons learned and best practice from the wide variety of available experiences of networking and partnerships already under way.

9. The meeting was divided into three substantive sessions. The first focused on recent trends in partnerships and networking for capacity-building in all sectors of the global economy. During this session, the Working Group addressed issues such as: the definition and types of science and technology partnerships; general trends in partnering and networking; their scope for capacity-building; the determinants and rationale behind partnerships and networking; and the role of national Governments and policy implications. Alliances, it was noted, took a variety of forms ranging from long-term multi-project partnerships pooling the production, research and marketing facilities of different companies, to joint ventures or multi-company research consortia involving technology cross-licensing and reciprocal marketing activities and to tripartite partnerships incorporating R&D institutions, government agencies and private firms.

10. The second session addressed the issue of energy partnerships and their critical contribution to the provision of energy supplies and services. Participants reaffirmed the importance and linkages of energy not only to the economy but also to current concerns about the environment and sustainable development. It was pointed out that growth in energy consumption was necessary to reduce poverty and improve the quality of life in developing countries, where nearly 2 billion people are without access to electricity and commercial energy. Providing adequate energy supplies and services to meet the energy needs of this large segment of the world's population while at the same time safeguarding the environment will be a major challenge to policy makers worldwide. International collaboration and partnerships in the area of energy technology are among the indispensable mechanisms we need to meet such challenges.

11. The third session focused on biotechnology, which has been, over the past few years, at the forefront of new forms of strategic alliances and partnerships. For many years, the industrialized countries have been witnessing new cooperative relationships in research and new kinds of symbioses between universities, R&D institutions and enterprises, or between otherwise competing enterprises themselves. Local networks of research institutions, firms and users, as well as international biotechnology initiatives, play an important role in building capabilities in developing countries. However, there was concern that developing countries have not been closely involved in the planning and design of most of the biotechnology initiatives in order to take into account local priorities and capabilities. North-South alliances could provide access to new technologies and bring financial gains for the use of the generic resources. South-South partnership agreements and networks could be used to develop specific R&D activities and enhance the quality of production.

1. Introduction

12. In her introductory statement, the Director of the Division on Investment, Technology and Enterprise Development recalled that, in recent years, globalization and trade liberalization have contributed to the integration of markets and to the diffusion of a process of innovation-based global competition among firms. The pressure of global competition has led firms - even traditional rivals - to increasingly engage in partnerships and networking. This development is largely in response to the growing knowledge-intensity of production and the emergence of an innovation-based mode of competition. Firms thus compete not only on price but also on their ability to innovate. The increasing intensity of competition and innovation has led to the shortening of product life cycles and added to the pressures on firms to continuously introduce new and improved products into the market. In the case of high-technology industries, scientific and technical knowledge has become a strategic competitive asset, but even in more traditional industries, such as textiles and garments, food production and fish farming, continuous innovation in product design, management practices and marketing has become the basis for survival and growth of firms in most countries.

13. These challenges have prompted firms to seek partnerships with other firms to pool their resources and to share the costs and risks involved in R&D activities. These developments are obviously of major concern not only to firms in the developed countries but also to firms in developing countries, where the pressure for innovation and adjustment to sustain competitiveness has made it more difficult for them to "catch up", and has led to the erosion of comparative advantage based mainly on low-wage labour. As globalization has put pressure on knowledge-based institutions and firms in developing countries to operate increasingly within market-based economies, more attention will have to be given to mechanisms and approaches that will enhance their capacity to innovate and compete. Partnerships and networking can provide an attractive way to accomplish these goals.

14. While inter-firm cooperation agreements have existed for a long time, they have mostly been one-way relationships as opposed to two-way partnerships, particularly as regards partners from developing countries. Traditionally, these one-way relationships, in the form of licensing agreements or franchising for instance, were formed to transfer knowledge about a product or a process to a licensee for a royalty fee. As they usually involve a partner who is more technologically advanced, the process of technology transfer tended to move predominantly in one direction.[1] Similarly, joint ventures and other production-sharing agreements, particularly in the mineral and petroleum industries, have been in existence since early in this century and have become increasingly significant since the 1960s. These early forms of one-way inter-firm relationships are in the process of being transformed into two-way partnerships. To a large extent, this transformation is the result of rapidly changing competitive conditions in many industries. This is particularly pronounced with regard to inter-firm technology and R&D agreements in knowledge-intensive industries, such as information technology.[2] Data in the MERIT/UNCTAD database show that the share of two-way partnerships involving a firm from developing countries in information and technology agreements rose from 22 per cent in the 1980s to 55 per cent in the 1990s. This upsurge deserves the attention of policy makers and suggests there is a need for greater analysis of the dynamics and implications of the processes involved at both the national and international levels. It is in this context that the CSTD decided to make scientific and technological partnerships and networking the main substantive theme of its fourth session.

2. Partnerships and networking: definitions, rationale and trends

15. The Working Group defined partnership as a two-way relationship which entails a long-term commitment between two or more parties whose objective is to share knowledge, enhance technological capabilities, foster innovation and strengthen competitiveness. Partnerships of this kind involve interaction and mutual dependency and entail the sharing of risks and costs as well as market access and power.

16. Networks come in many forms, representing a broad spectrum of collaboration agreements. Usually, a network consists of a group of institutions or associations whose aim is to enhance capacity to conduct research and improve training and education through interaction. Partners benefit from their involvement in the network by gaining access to new ideas, methodologies, information and learning materials. They also benefit from networks by collaborating with others in training and research programmes and by sharing experiences. Networks link institutions and enterprises that are willing to share experiences, research results, skills and information in order to gain knowledge and improve innovation. A network has to be efficient to compete successfully against other organizational forms. It also has to be attractive if participants are to stay in and invest in it. Gains have to be equitably shared to promote trust and to foster loyalty. One of the main characteristics of a network is that it does not require geographical proximity of the parties involved.

17. The experts noted that the reasons for forming partnerships differ depending on the type of sector involved and on the objectives of the parties. In general, however, the most important incentives motivating firms to engage in forming partnerships are the need to build and upgrade technological capacity, stimulate innovation and improve competitiveness and market access. Other factors motivating companies to enter into cooperation agreements are the sharing of costs and market risks, the greater efficiency resulting from economies of scale and the possibility of accessing new financial resources and finding markets with fewer regulatory barriers.

18. In discussing the role of partnerships and networking in capacity-building, the experts noted that the few available studies involving developing countries show that many partnerships and networks have been very important in fostering technological upgrading and improving the quality of products across a wide range of industries, particularly in the countries of South-East Asia. For developing countries, the acquisition of advanced technology, whether through partnerships or through foreign direct investment (FDI), has been instrumental in building their own technological capabilities to break into export markets and then maintain market share. On the other hand, many partnerships have been ineffectual, particularly when local needs, priorities and capabilities are not taken into account. One expert also noted that, in trying to establish partnerships with foreign partners, some developing countries face constraints resulting from the rules imposed by certain countries on both domestic and non-domestic firms seeking partners in those developing countries.

19. In their presentations, the experts noted that the last few years have seen a substantial increase in networks and partnerships across a wide range of industries. The bulk of partnerships, however, remain confined to firms from developed countries. The literature shows that, since the early 1980s, inter-firm alliances have primarily been concentrated in high-tech industries, such as information technology, and, increasingly, in biotechnology and advanced materials, mainly in developed countries. Anecdotal evidence shows that, since 1990, there has been a steady increase in South-South and North-South technology partnerships involving diverse actors such as enterprises, academic institutions and R&D centres. The number of reported partnerships in information technology - mainly in telecommunications - involving at least

one participant from a developing country grew faster than partnerships involving partners from developed countries only. In addition to the larger and more technologically advanced developing countries such as Brazil, China, India, Malaysia and the Republic of Korea, a wider spectrum of small countries have also become viable technology partners.

3. Capacity-building through partnerships and networking

20. Surviving in a competitive economy depends increasingly on knowledge, innovation, management and technological capabilities. Experts stressed that knowledge-based activities require the building of multidisciplinary institutions that support local industries by providing essential knowledge and expertise. A trained workforce can make the difference between the success and failure of any partnership. The transfer of advanced technology may be of little use if domestic technical and managerial skills are not available to adapt, operate and manage it. For this reason, building indigenous capacity has become the basis of economic success and export performance. The experience of the countries of South-East Asia vividly demonstrates the importance of technological capacity in sustaining export growth that was originally based on labour cost advantages.

21. Experts also noted that while Governments in developing countries have long acknowledged the critical importance of capacity-building, many have done little to commit adequate investment to the development of training programmes that promote technological capabilities. However, over the past decade a number of countries in Asia and Latin America, and more recently in Africa, have made conscious efforts to build up technological capabilities that would help them not only catch up but also keep up with today's international competition.

22. In discussing the process of technological capacity-building, experts emphasized that partnerships and networking should not be considered as ends in themselves. They should not be expected to be more than they are: they are only two of the many possible ways of building technological capability. Partnerships may complement the efforts of developing countries to acquire technology and build capacity through other means, most notably FDI. However, like FDI, partnerships tend to be much more concentrated in countries that have already committed large investments to both infrastructure and human resource development and that have achieved a certain degree of domestic technological capability and market maturity. In many developing countries, the reality may be very different; they often lack the capacity to form strategic alliances and compete strategically. The competitive environment is also usually weak because of restrictive regimes, which tend to shelter inefficient local firms from international competition. In such an environment, it is very difficult to conceive of effective partnering and networking unless there is strong support and commitments from local Governments as well as from donor countries. Government intervention may be necessary to provide incentives to existing enterprises to build up and upgrade capabilities and to develop complementary capabilities through education and training. It may also facilitate linkages between universities and industries to disseminate information and technological innovation. Donations made by the Governments and NGOs of developed countries can also play a vital role in assisting national efforts to build the institutional capacity to train workers from local enterprises in the use of advanced technology and in assessing its impact.

4. The role of Governments in fostering partnerships and networking

23. The Working Group reaffirmed the important role that Governments can play in fostering partnerships and networking. Government policies are indeed essential not only to the attraction of FDI but also to inter-firm agreements, including those on R&D and related high value-added activities. Government

policies can also hinder potential partnerships by sending confusing signals or by simply discouraging them. The use of incentives such as the elimination of trade barriers, the opening up of markets and the reduction of corporate taxes is likely to contribute significantly to the promotion of partnerships and networking.

24. The initiation and establishment of partnerships, particularly those involving firms from developing countries, is not a spontaneous process. It involves a web of complex factors, whether legitimate or not, which may determine the scope of the process and its success or failure. Experiences with inter-firm technology cooperation in industrialized and industrializing countries reveal that support from Governments, both through direct and indirect measures to foster partnerships, is fundamental. The question is, what can the Governments of developing countries do to attract viable technology partners and foster partnerships? A useful starting point in attempts to answer this question is to examine the process involved in initiating and establishing partnerships.

25. The findings of case studies involving inter-firm technology collaboration in the countries of the Southern Common Market (MERCOSUR) presented by one of the experts show that government support is likely to be more crucial to the establishment of networks and partnerships in developing countries and in economies in transition, where most firms, especially SMEs, lack the technological capabilities and financial resources needed to attract potential partners and create successful partnerships. Even in situations where the firms themselves are quite advanced technologically and are able to form a partnership, there are likely to be other factors that ultimately determine the establishment and fate of the partnership.

26. There was consensus that the role of Governments in promoting the establishment of inter-firm agreements is very important. Governments can help promote inter-firm agreements by designing a regulatory framework to make sure that the rights and obligations of the partners are respected. Government policies can also facilitate the initiation and sustainability of technological partnerships by providing a forum for the exchange of information and for discussion, and by promoting and funding research and development projects. Governments can also assist in fostering technology partnerships by involving business associations and other relevant institutions and by paying greater attention to the "soft" issues of technology exchange and transfer, such as education and training. Education and basic research, especially in universities and training institutions, should to be strongly supported by the State.

27. Traditionally, cooperation in science and technology has evolved as a random process, sometimes based on the interests of the donor countries, sometimes on the scientific interests of influential scientific and technical institutions and at other times on the outcome of bilateral discussions. Experts emphasized that Governments need to spell out clear national strategies and goals for the development of science and technology if they are to forge effective technology policies.

28. International organizations and institutions can also play a major role in supporting the efforts of Governments in developing countries and in countries with economies in transition to promote partnerships with foreign private firms, especially transnational corporations. The successful establishment of partnerships also requires the active involvement of key economic actors such as industry and business associations to raise awareness and facilitate cooperation.

5. Partnerships and networking in the energy sector

29. Energy is vital for economic growth and social development. It is used to provide all the services that facilitate human endeavour from lighting, heating and air-conditioning through food and industrial production to communication and modern transportation. Yet poverty puts these modern energy services beyond the reach of nearly half of the total population in the developing countries. It is not surprising that meeting the energy needs of this large segment of the world's population has become a major preoccupation of economic planners and an issue of considerable political debate in most countries.

30. Experts pointed out that the provision of energy has traditionally been the responsibility of the State in most countries. Furthermore, ready access to modern energy supplies and services has come to represent both a basic policy goal and a measure of social and economic progress. In developing countries, most energy programmes and projects are still centrally driven and subsidized in many ways. Regarded as a strategic resource as well as a necessary public good, energy services have tended to be centrally planned and protected from market forces. Political and social considerations have encouraged Governments worldwide to provide large subsidies to insulate consumers from the true cost of provision.

31. In presenting some African experiences and lessons in partnering and networking in the energy sector, one of the experts recalled that as economic systems as well as international credit and donor policies, shift towards encouraging more sustainable and market-based activities, energy institutions are faced with the need to provide more efficient energy services within a competitive environment. Given their lack of capacity, knowledge-based institutions, particularly in Africa, increasingly face challenges and opportunities in establishing strategic networks and partnerships, which could substantially enhance their effectiveness. However, few knowledge-based institutions are in a position to respond to these challenges. Donor assistance can still play a significant role in building capacity in knowledge-based organization in the energy sector and in initiating effective networking and partnering activities.

5.1 Why energy partnerships are necessary

32. In the discussion on energy demand and its growth, it was noted that energy demand in developing countries is rising rapidly as a result of population growth and economic development. This burgeoning demand for energy creates shortages, particularly of electricity, that disrupt industrial growth and lower the quality of life. Moreover, the supply of energy depends, to a large extent, on systems that are unsustainable owing to the depletion of exhaustible fossil-fuel resources and the over-consumption of traditional energy sources such as fuel woods and biomass, which destroys forests and pollutes the atmosphere. While solutions to these problems are available, it will take many years to put them into effect; meanwhile, ignoring them can only have more negative effects for the environment. The objective now should be to accelerate the introduction and use of commercially viable renewable energy technologies in developing countries. Through partnerships, energy companies with the appropriate technology and expertise can play a positive role in helping developing countries to achieve this objective.

33. Given the growth in energy demand and the various financial considerations involved, the current business-as-usual way of dealing with energy means the outlook for developing countries is a bleak one of capital constraints, mounting debt, shortage of energy supplies and more serious environmental problems. Many countries already face such problems, and, with growing populations, the problem become worse. Therefore, a new, more feasible and sustainable approach to energy must be found. This was

recognized at the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, but no coherent strategy to deal with the question was put in place. Therefore, if the objective of achieving a sustainable energy future is to be realized, Governments, industry and the private sector have to find more practical measures to make that happen. Partnerships and collaboration in energy technologies and capacity-building can help us to achieve that goal.

5.2 Scope and benefits of energy partnerships

34. There is perhaps no more pressing challenge facing the energy sector today than to provide energy - particularly to those who have no access to it - in ways that are consistent with addressing environmental concerns and sustainable development. Multilateral and bilateral assistance will undoubtedly help, but an enabling environment that includes incentives for energy investments and support mechanisms for partnerships with multinational energy companies will be necessary.

35. Partnerships in energy can provide a mechanism for countries to hedge the costs of complex and risky projects, which can be very high, particularly for long-term projects. They can also help improve national R&D capabilities, standardize methodologies and disseminate information on technology capabilities. The absence of partnerships could lead to a situation where a number of countries separately conduct costly research that may lead to similar results, and thus unnecessarily spend valuable research money that could be used elsewhere. Partnerships can help avoid duplication and unproductive research paths, as well as the development of advanced technology without an industry or a market for its use. Partnerships on energy projects provide a framework for experts on specific technologies to work together and exchange information on areas of mutual interest.

36. In discussing the different modes of partnerships in energy, participants noted that such partnerships have been formed by entities with different motivations: Governments propelled by the need to secure energy supplies, acquire technology, build indigenous capacity, promote renewable energy technologies and confront energy-induced environmental problems, and businesses enticed by investment opportunities. In the least developed countries, there have been a number of attempts to promote networks and partnerships in the energy sector. Many of these have been initiated and funded by donors. Many of the partnerships have been motivated by a need to enhance capacity, mostly through the sharing of public-domain information and experience, while others have not responded to local needs and aspirations.

37. One of the most important areas where international cooperation and partnerships are essential is global environmental protection. The international nature of many environmental problems requires an international response aimed at finding solutions to global, regional and local environmental problems such as greenhouse gases, acid rain and particulate emissions. The objective of the United Nations Framework Convention on Climate Change, for example, can only be achieved with the active participation and contribution of all States, which are parties to the Convention.[3]

38. Collaboration in energy technology R&D is another fundamental area of energy cooperation aimed at the improvement of the long-term security of energy supplies by promoting diversity, efficiency and flexibility within the energy sector. At present, there are a large number of agreements covering collaboration in energy research and development among member States of the International Energy Agency.[4]

39. Another significant form of international energy cooperation is participation of the foreign private sector in the provision of electricity

production and distribution in developing countries under sometimes complex but workable arrangements such as build-operate-trade (BOT) and build-own-operate (BOO) schemes. Such schemes shift the responsibility for financing, building and operating utility companies from the government to the private sector. Under a BOT arrangement, for example, a private company, or a joint venture with a minority equity participation of the host Government, is set up to raise funds, and plan, design and construct the power-generation facilities. The private company then operates the project facilities for a determined period, intended to be long enough to pay off debt and recoup an acceptable return on the investment. At the end of this period, ownership of the facilities is transferred to the host country. Among the potential benefits to be gained from BOT arrangements are the expertise and the advanced technology that independent power producers usually bring with them. In addition, the private investors bring financial capital to the project. However, because the legal, institutional and financial arrangements are usually complex, only a limited number of projects have been successfully launched. Developing countries that have benefited from such projects include China, India, Malaysia, Mexico and Thailand.

5.3 Some examples of energy partnerships

40. At government level, international collaboration and partnership agreements on energy technology are still largely confined to the industrialized countries, although their use has spread to a number of developing countries, particularly NICs. Asia Alternative Energy is an energy cooperation project created by the World Bank, with support from the Netherlands Ministry of Development Cooperation, the United States Department of Energy and other donors. Its mandate is to stimulate environmentally sustainable and commercially viable renewable energy and demand-side management in Asia. The project has already commissioned case studies of recent experiences in Indonesia, Sri Lanka and the Philippines and has identified key factors for successful residential photovoltaic programmes and ways to overcome the financial and institutional barriers to the use of solar power. It has provided insights into best practices to improve the prospects for successful project design and implementation.

41. An expert pointed out that a number of networks have been established through donor-funded activities with locally based institutions in Africa to facilitate the growth of local markets for photovoltaic and other renewable energy and energy-efficient technologies from developed countries. One such project is the Renewable Energy Information Network for Southern Africa, which has been funded by the European Commission. The network incorporates a number of policy analysis and advocacy institutions in southern Africa, as well as government energy departments, and provides databases and market-research activities. One of the experts voiced concerns that such marketing and supply-oriented projects are seldom sensitive to the needs of the local population or to demand-side issues or to questions of choice and affordability. One of their explicit initial aims is to provide information linkages to European manufacturers. Other similar networking and partnering projects have the same objectives, that is, they are more concerned with opening up markets for energy products from the developed countries than with alleviating poverty through the provision of affordable energy services to rural and unserved urban populations in developing countries.

42. Similar concerns have also been voiced with regard to many networks in Africa related to climate change. These networks are generally well funded through multilateral and bilateral development assistance programmes, but there is a real concern that instead of building capacity, the multiple-donor programmes in climate-change networks have actually diminished knowledge-generating activities in pressing areas of more relevance to the energy sector in Africa, by diverting the capacity of knowledge-based institutions from the core problems and challenges facing the sector, namely the role of energy in

poverty alleviation and in supporting economic development.

43. Clearly, such concerns neither diminish nor deny the importance of energy partnerships. When motives are spelt out and objectives clearly identified, partnerships can help local knowledge-based institutions to position themselves strategically and so respond efficiently to local needs and opportunities.

44. With the exception of the R&D being undertaken by international energy companies, research into energy technologies is still mainly a government-funded activity in many countries. However, a number of private institutions and firms have emerged as competent partners. A number of such need-driven strategic networks and partnerships, as well as joint ventures involving Governments, business and industry and covering a wide range of energy projects, have been established.[5]

45. Experts noted that international enthusiasm for partnerships and collaboration in energy technology reflects awareness of the benefits of relying more on renewable energy sources. These sources help to fill our energy needs, but their contribution could be much larger. Future expansion of renewable energy requires fundamental changes in policy and practice by Governments and businesses, including greater international collaboration, full environmental costing of conventional energy sources, and continuing R&D and pilot projects to reduce costs, improve performance and establish consumer confidence.

6. Partnerships and networks in biotechnology

46. The expert presenting the paper on biotechnology partnerships and networking pointed out that biotechnology is a term which has come to be familiar to most people, even though it has not been universally defined. According to one common definition, biotechnology is "the application of biological science to the manipulation and use of living things for human ends". According to another, similar definition, it is "the application of biological organisms, systems and processes based on scientific and engineering principles to the production of goods and services for the benefit of man".[6]

47. Even though the concept itself may date back to the 1950s, with the unravelling of the genetic code and recombinant DNA technology, biotechnology, as we know it today, is a by-product of the knowledge revolution that has characterized the world economy over the past decade or so. The scientific developments underpinning biotechnology across a wide range of industries, from agriculture and food production to health and pharmaceuticals, have been extraordinary both in speed and innovation. Pharmaceuticals, health and food production have been the ones most affected, but other industries are also benefiting from the extraordinary versatility of biotechnology. In the discussion on the potential contribution of biotechnology to economic development, it was pointed out that while the technology is very promising, it has evoked contrasting reactions and intense public debate, ranging from ideological reactions to exaggerated and often unrealistic expectations. There are also concerns over its environmental and health consequences and the appropriate legal and regulatory framework for the industry.

48. In some cases, Governments in developed countries have played a useful role in supporting the nascent biotechnology industry, but the vast majority of partnerships take place in the private sector, with no government involvement. Large pharmaceutical companies have entered into a number of inter-firm agreements with small biotechnological firms though R&D contracts, licensing agreements and minority shareholdings. The sharp increase in biotechnology inter-firm agreements has come about because scientists and managers have teamed up to tap into the potential of this field, which is

perceived as being one of the key technological areas for the future. In many cases, Governments have provided additional research grants and other support, including legal frameworks, with the objective of securing the competitiveness of domestic industry in this area.

6.1 How important are biotechnology partnerships?

49. Experts highlighted the importance of partnerships and networks in biotechnology in improving technological capabilities and making successful innovation possible. Alliances in pharmaceutical biotechnology abound. Cross-border biotechnology mergers are on the increase and biotechnology companies are increasingly becoming an integral part of the pharmaceutical industry. One of the aims of pharmaceutical companies now is to forge alliances with biotechnology companies for the provision of emerging technologies to help the pharmaceutical companies, who are spending a large share of their R&D budgets on taking equity stakes in biotechnology companies and in forging alliances with them.

50. Partnerships and networks in biotechnology innovations related to agriculture and food are less widespread than in the pharmaceutical industry, but are also important. The role of biotechnology in agriculture and food production is conditioned by the extent of the diffusion of the technology, which in turn, depends upon a number of factors, including technical feasibility, economic profitability, safety and public acceptance.

6.2 What can biotechnology offer developing countries?

51. Experts pointed out that while global food production has been rising, per capita food output has declined in a large number of low- and middle-income countries. In most sub-Saharan African countries and in the Middle East, the degree of self-sufficiency in grains, the most important food staples in the diets of these regions, has declined. Even in the most productive areas of cultivation in Asia, where intensive agriculture has been practised for many years, annual growth rates in yields per hectare of rice and wheat have also declined. According to the Food and Agriculture Organization of the United Nations (FAO), these trends are likely to continue well into the next century. The FAO expects that by 2010 a large number of developing countries that are net food exporters will have become net importers of agricultural products. Other developing countries in Latin America and the Caribbean, North Africa, West Asia, and the Pacific and Indian Ocean islands will also be affected. Further expansion of land for cultivation will be difficult in much of the developing world. This implies that future growth in food production will have to rely increasingly on higher yields. Innovation and technological upgrading, brought about by biotechnology, will be vital in making that happen.

52. It was noted that while biotechnology has much to offer developing countries trying to improve their food and agricultural output, large multinational companies are unlikely to make crops in poor developing countries the focus of their attention. In order to use, operate and adapt the technology to local conditions, developing countries will need to build indigenous capacity. A number of studies related to developing countries' attempts to build capacity in biotechnology have stressed the need to acquire technological capabilities through networks and partnerships. They have also stressed the need for links and interactions among the various actors, including private and public sector institutions, both national and international, and between government policies and market forces.

6.3 Trends in biotechnology partnerships and networking[8]

53. The potential benefits that biotechnology could bring to a wide range of industrial applications gave rise in the late 1970s and early 1980s to the

emergence of a large number of small biotechnology firms, particularly in the United States. Many of them were established in geographic clusters and located close to reputed universities in California and Massachusetts, for easy access to scientists and academics. Many of those firms were founded by scientists and venture capitalists seeking to marry scientific ideas with finance and management skills to generate income streams quickly. However, instead of generating profits and earnings, many generated losses and bankruptcies and instead of having products they had dreams. After the initial euphoria, which allowed many of those start-up firms to raise money to finance what has become known as a "burn rate" - the money they spend on R&D in the years prior to bringing a product to market and generating income - a process of takeovers and acquisitions gave large companies from various sectors control over many of those newly founded small biotechnology firms.[9]

54. That initial euphoria was brought about by the promise that biotechnology companies could develop drugs more quickly than large pharmaceutical corporations. That proved not to be the case. It took even the most successful companies the industry standard of about 10 years to deliver their first drug, in large part owing to regulatory hurdles. For example, it took Amgen, considered the most successful company in the history of the biotechnology industry, nine years to bring its first drug to market. With the notable exception of Amgen and Genzyme, few of the most successful biotechnology firms survived as independent entities in the 1980s and 1990s. Genentech, the second-largest biotechnology firm, was taken over by Hoffman La Roche, and Chiron, the fourth-largest, was acquired by Ciba-Geigy. Meanwhile, Amgen reinforced its position at the top of biopharmaceutical companies through its acquisition of Synergen. By the end of the decade, the large pharmaceutical firms had consolidated their positions through acquisitions and alliances, made easier by the financial difficulties that faced most of the smaller dedicated biotechnology firms.

55. As a result, throughout much of the 1980s, biotechnology played an increasingly important role in the pharmaceutical industry, as the big pharmaceutical companies began to tap into the flourishing innovation brought to them by biotechnology firms. The failure of many of those small dedicated biotechnology firms to survive as truly independent players suggests that technological skills alone do not guarantee successful economic and commercial operations. The amount of financial resources needed and, the inability to take advantage of economies of scale in R&D as well as in distribution and marketing can be serious constraints for new start-ups.[10]

56. Alongside those mergers and acquisitions, networked, knowledge-based biotechnology alliances and partnerships emerged. Prior to 1979, 62 technological agreements in biopharmaceuticals were finalized. In the period 1980-1984 this rose to 222 agreements and in 1985-1989 to 398 agreements. During this latter period, other biotechnology agreements were also signed, including 123 in agro-biotechnology, 89 in basic biotechnology research and 108 in other sub-fields of biotechnology, bringing the total number of agreements finalized in that period to 718, an increase of 83 per cent over the 1980-1984 period. Towards the end of the 1980s and in the early 1990s, there was a marked slowdown in the number of inter-firm biotechnology agreements signed. Since 1993, however, strategic alliances in biotechnology have picked up again as a result of more intense competition in an industry that has become international and more mature. Europe now has at least 500 biotechnology companies, of which about 50 are publicly traded. Alliances between big pharmaceutical companies and these European biotechnology companies are increasing. Cross-border biotechnology alliances and mergers are no longer a rarity. To the extent that these strategic alliances continue to take the form of North-North partnerships, there is a real concern that developing countries' firms will be left behind. Available evidence, however, suggests that biotechnology networks and partnerships, particularly in R&D, are also emerging rapidly in many developing countries.

6.4. International biotechnology initiatives in developing countries

57. Developing countries receive over 50 per cent of the financial commitment to international initiatives in biotechnology research programmes and networks, including international agricultural research centres, universities and national research organizations.[11] In addition, many developing countries participate regularly in policy workshops, including workshops on bio-safety and intellectual property rights, and attend training courses offered either in universities in developed countries or in international agricultural research centres located in developing countries. While over 60 developing countries are involved in these international biotechnology initiatives, most efforts are concentrated in a few countries within each geographical area: Côte d'Ivoire, Egypt, Kenya and Zimbabwe in Africa; India, Indonesia and Thailand in Asia; and Brazil, Costa Rica and Mexico in Latin America.

58. In one of the presentations it was stressed that while donor-funded biotechnology initiatives provide training opportunities for developing countries' scientists and engineers and can thus enhance national scientific and technological capabilities in agriculture, in most cases, developing countries have not been closely involved in the selection, planning or design process of those programmes. Rather, many of the initiatives were designed, and the research priorities determined, by scientists and managers from the donor countries. Only a few of the initiatives involve consultation at the grass-roots level with small farmers, for example - in their design and implementation.

59. In addition to these international biotechnology initiatives, a number of alliances and partnerships involving firms from developing countries emerged in both pharmaceutical and agricultural-related biotechnology, either in collaboration with local research institutions or in cooperation with foreign partners. Throughout much of the 1980s, a number of large firms in Argentina, Brazil, India, the Republic of Korea and Taiwan Province of China invested heavily in the nascent biotechnology industry. To face up to the challenge of competition and to remain at the technological frontier, some of those firms have become involved in partnering activities with other firms from both the North and the South. While such firms succeeded in crossing the barriers to entry increasingly being built by powerful, knowledge-based oligopolies in the North, the fact is that to date most of the biotechnology innovation and R&D, even that being undertaken in developing countries, is designed according to the priorities of developed countries and oriented towards their markets.

7. Conclusions

60. The Working Group meeting convened by the CSTD raised several policy issues for consideration by the different actors involved in the process of partnerships and networking. Among the broad policy questions considered were:

(a) Have we entered a new era of networks and partnerships, and have they have become an essential form of strategic interaction for firms?

(b) If so, under what conditions do they present new opportunities and constraints for firms from developing countries and countries in transition to build indigenous capacity and technological capability?

(c) What might Governments and the international community do to promote this process?

61. The available data support the view that we have indeed entered a new era of partnerships and alliances. The recent upsurge in inter-firm agreements brought about by globalization and accelerated by the emergence of a knowledge-based global economy is probably irreversible, at least in the foreseeable future. As we move into the next millennium, the process of partnering and networking will not simply be an option; it is likely to be an essential tool to maintain competitive lead. Firms and Governments alike will have to look outward and to each other and seek out new forms of collaboration and integration to face up to the challenges of globalization and not be left behind.

62. Although concerns were raised about the benefits or otherwise of partnerships and networking particularly in poor developing countries, there was agreement that partnerships and networking offer a valuable tool for developing national potential in science and technology. Partnerships and networking can be effective mechanisms to foster the generation, sharing and diffusion of scientific and technical knowledge. They can be a key to the transfer and exchange of technology, building indigenous capacity, fostering technological capability and improving competitiveness. They can also be extremely useful tools for firms in developing countries and countries in transition who wish to access international markets and enhance their export performance. By facilitating access to technologies and markets, inter-firm partnerships can potentially contribute to the more effective integration of developing countries into the world economy. Partnerships can also be vehicles to mobilize the funds and technological expertise needed to build and expand infrastructure. The least developed countries in particular lack the necessary financial and human resources to meet their burgeoning needs for energy supplies and services on their own. BOT and BOO agreements can help them to get power stations built to provide energy services to their rapidly growing populations.

63. All participants favoured inter-firm cooperation. They agreed that there is no formula for successful partnering and networking that can be applied universally in all situations. A critical factor in the success of a project, is the commitment of all partners at all levels. The success or failure of inter-firm cooperation depends on the specific situation and on the aims and objectives of the parties involved. Nevertheless, experience has revealed some of the general dynamics that make inter-firm agreements work. These include: (a) thorough preparation, that is, seeking information, identifying the right match and minimizing the risk of conflicts; (b) clarity and commonality of motives, that is, mutual agreement on precise objectives, and appropriate modes of governance; (c) the creation of the conditions for learning, that is, the exchange and training of personnel, building trust and introducing methods for monitoring and assessing the process; and (d) the completion of the "collaboration cycle", that is, ensuring that tangible benefits are achieved and, if not, deciding whether to continue with the collaboration.

64. Similarly, the benefits of partnering will not be the same for all countries. They will depend, *inter alia*, on existing conditions, such as specific local economic and social needs and the level of development of the enterprise sector in the host country. If they are to achieve their objectives of building indigenous capacity and facilitating access to capital, technology and markets, partnerships must be supported by active business associations and appropriate government policies that encourage the growth and success of inter-firm cooperation. It was emphasized that approaches to cooperation and partnerships, particularly in developing countries, should take into account the concerns of all actors and stakeholders in development, including those at the grass-roots level, Governments, firms, institutions and NGOs. It was also emphasized that partnerships have to be established equitably.

65. Governments have an important role to play in promoting partnerships and networking, particularly in developing countries. Recent studies on partnerships and networking reveal that the presence of an enabling environment which ensures a stable macroeconomic policy and a credible legal framework and which includes incentives and support mechanisms is of paramount importance to inter-firm cooperation. These are especially important because they affect foreign firms' incentives to enter into partnerships to which they will have to allocate large amounts of financial and technical resources. Governments also have an important role to play in supporting networks and cooperation between universities based on fair principles of balanced contributions. International and regional organizations as well as multilateral financial institutions also have a role to play in complementing the efforts of developing countries and countries in transition to promote partnerships and networking in science and technology.

66. Shedding light on the above issues and focusing attention on the critical importance of building indigenous capacity and technological capabilities as indispensable inputs to sustainable development in both developed and developing countries was one of the objectives of the CSTD in convening the meeting of the Working Group. There are currently a large number of collaboration agreements on biotechnology and on the sustainable use of energy in effect in developed countries and, to a lesser degree, in developing countries and economies in transition. There was agreement that international collaboration should involve more developing countries, where the demand for both food and energy is expected to rise dramatically over the coming decades. Providing adequate supplies of food and energy to meet these growing needs while at the same time safeguarding the natural environment will be a major challenge to policy makers worldwide. There are many opportunities for cooperation between developed and developing countries that would accelerate the development and use of sustainable energy technologies and biotechnology. For developing countries to leapfrog to a sustainable path of energy and food production, they need a strong indigenous capacity and technological capabilities to adapt, operate and develop advanced alternative technologies. Partnerships could help firms in developing countries and countries in transition to become integrated in the world economy. In many developing countries, firms, especially SMEs, do not have the necessary expertise, technological capacity or funds to pursue innovation on their own and to compete on a global scale.

8. Recommendations

67. The discussion at the meeting of the Working Group resulted in findings and recommendations in terms of policy options and initiatives that both developing countries and economies in transition could use to promote partnering and networking between firms. The following are some of the main findings and recommendations addressed to Governments:

(a) Create and maintain a stable macroeconomic and policy environment that includes incentives and support mechanisms which encourage investment and foster technological capabilities and industrial development;

(b) Prepare the ground for inter-firm cooperation through the creation of a forum for dialogue with private and public sector bodies, with a view to raising awareness about the potential benefits and critical role of inter-firm cooperation in building technological capacity and in promoting export growth;

(c) Identify, in cooperation with national business associations and knowledge-based institutions: (i) priority areas for the development of technological capacity, where international partnerships and networking could play and essential role; (ii) the major needs of

local firms in terms of technology, expertise and know-how, in order to map out clear objectives, expected output and monitoring tools; and (iii) useful services that could be provided to foreign firms interested in forming partnerships with domestic companies and that could help in establishing more equitable and balanced partnerships;

(d) Provide a stable legal and regulatory framework for business and inter-firm agreements and transactions, including the introduction of procedures that facilitate the clarification of any disputes and a system of property rights that protects both foreign and domestic firms willing to engage in partnerships;

(e) Provide support to foster partnerships between public and private institutions by contributing information and knowledge, harmonizing rules, financing the development of R&D activities and infrastructure, brokering between potential partners, and raising public awareness of the role and benefits of partnerships and networking in science and technology;

(f) Support partnerships and networking between academic institutions and provide the necessary means and infrastructure for basic research, with a view to enhancing indigenous capacity-building;

(g) Given the extent of burgeoning energy demand and financial considerations in developing countries, partnerships and collaboration on energy technologies have to increase in order to: (i) promote indigenous capacity-building in developing countries; (ii) provide modern energy services to rural and unserved urban populations through more use of renewable energy technologies; and (iii) encourage private sector participation in the provision of electricity supplies under innovative arrangements, such as BOT and BOO schemes.

68. Experiences in both developed and developing countries have revealed some of the factors and dynamics that lead to successful partnerships and networking. From these experiences, the CSTD, in cooperation with the secretariat, may wish to design a methodology based on best practices in inter-firm partnering and networking and develop criteria by which to measure their success, and to build an inventory of opportunities for international partnerships and networking in science and technology. In this connection, the results of the ongoing studies on guidelines for the successful performance of networks which are being carried out by experts on behalf of the CSTD, should be taken into consideration.

Notes

1. T. Tesfachew, "The role of governments in promoting inter-firm technology cooperation, paper published in ATAS XI Bulletin: *New Approaches to Science and Technology Cooperation and Capacity-Building* (United Nations publication, sales no. E.99II.D.4).

2. UNCTAD, *World Investment Report 1998: Trends and Determinants* (United Nations publications, sales no. E.98.II.D.5), p. 29.

3. United Nations Framework Convention on Climate Change, A/AC.237/18 (Part II)/Add.1 and Corr.1, United Nations, New York.

4. International Energy Agency, *International Energy Technology Collaboration: Benefits and Achievements* (Organisation for Economic Co-operation and Development (OECD), Paris, March 1996).

5. For a list of energy partnerships, refer to M. Hamdi, "International and regional partnerships in energy", paper published in ATAS XI Bulletin: *New Aapproaches to Science and Technology Cooperation and Capacity-Building*, (United Nations publication, sales no. E.99II.D.4).

6. A. T. Bull, G. Holt and M. D. Lilly, Biotechnology: International Trends and Perspectives (Organisation for Economic Co-operation and Development (OECD), Paris, 1982), p. 21.

7. J. Bunders, B. Haverkort, and W. Hiemstra, ed., *Biotechnology: Building on Farmers' Knowledge* (London and Basingstoke, Macmillan 1996), p. 2.

8. This section draws heavily on L. Mytelka, "New trends in biotechnology networking", *International Journal of Biotechnology*, vol. 1, no. 1 (1999), pp. 30-41.

9. C. Correa, "South-South dimensions for partnering, implementing strategic alliances in the biotechnology sector", a paper published in ATAS XI Bulletin: *New Aapproaches to Science and Technology Cooperation and Capacity-Building* (United Nations publication, sales no. E.99II.D.4).

10. Ibid.

11. C. Brenner, and J. Komen, "International initiatives in biotechnology for developing county agriculture: promise and problems", Technical Paper No. 100, produced as part of the research programme on International Policy Issues (OECD, Paris, 1994).

Annex I

List of Working Group members and experts

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Dr. Neils Busch	Busch & Partners, Copenhagen, Denmark
Professor Anton Eberhard	Economic and Development Review Committee - University of Cape Town, South Africa
Dr. Joanna Chataway	Biotechnology Policy Group, the Open University, United Kingdom

Annex II

List of background documents

"Building capacity in biotechnology: the role of networks and partnerships", by Joanna Chataway

"Strategic Alliances for Developing Countries", by Nicholas S. Vonortas

"Strategic knowledge-based partnering and networking for capacity building in the energy sector: some African experiences and lessons", by Anton Eberhard

"Partnerships for resource efficiency and technology transfer", by Dirk Pilari

"International and regional partnerships in energy", note by the UNCTAD secretariat

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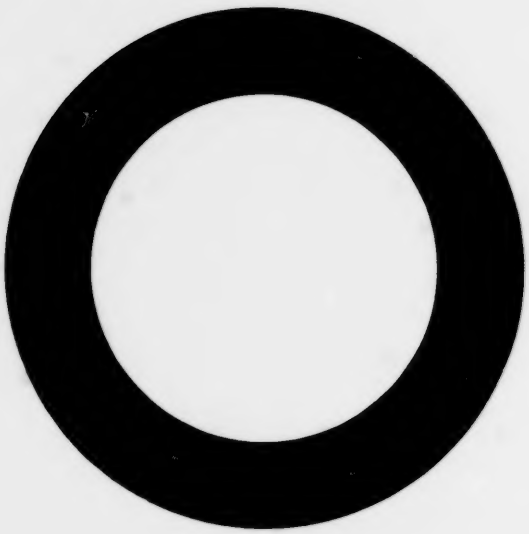

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CSTD Panel Meeting on

Biotechnology for Food Production and Its Impact on Development

Report by the secretariat

GE.99-51013

EXECUTIVE SUMMARY

1. With its wide array of techniques and applications, agricultural biotechnology offers the potential for increasing and improving food production capacity and promoting sustainability. However, developing countries are deriving only limited benefits from it owing to declining public sector investments in agricultural research and development and to the dominant role that multinationals and the private sector currently play in biotechnology. The global seed trade is dominated by large private industry giants whose vast economic power and commercial control over plant germplasm is beginning to overshadow the role of the public sector in plant breeding and other agricultural research in many countries. Strong and restricted protection mechanisms of biological resources have made biotechnology less accessible, and this has led to serious inequities between developed and developing countries. In an attempt to shed more light on this and other issues, the Commission on Science and Technology for Development (CSTD) decided to identify areas where further work needs to be done in biotechnology acquisition, adaptation and diffusion. In response to this request, a Panel meeting on biotechnology was convened by UNCTAD from 21-22 January 1999.

2. The discussion was organized around three thematic areas: (i) issues related to plant and animal species and their traits, as well as to some biotechnology techniques and their applications at the local level; (ii) endogenous capacity-building for the development and transfer of biotechnology, including mechanisms for integrating biotechnology into the mainstream of agricultural research; and (iii) other critical issues related to biotechnology which may have an impact on food production, particularly those that need to be addressed at the international level.

3. Although modern agricultural biotechnology is often associated with the large-scale crop production in industrialized countries, its techniques could in fact be used to enhance the traditional small-scale mixed-crop farm setting as well. The Panel discussed the potential role of genomics in crop improvement and emphasized the need to improve food crops for domestic consumption and for exports in anticipation of global population increase in the next millennium. The experts noted that biotechnology could potentially be a means of "wealth creation" and a basis for international commercial competitiveness. They also highlighted the role of biotechnology in extending post-harvest life and in improving nutritional contents as traits which could be an immediate boon to developing countries' food sufficiency programmes. The Panel cautioned that the introduction of biotechnology into the agricultural sector should be monitored closely in order to prevent adverse effects on biodiversity. It also pointed out that each country needs to pursue its own development priorities in biotechnology, including genotyping and preserving the country's biodiversity. In this context, the Panel expressed the need for global networking in biotechnology, involving both private and public sectors, as a means for sharing and disseminating information, knowledge and experience, as well as for identifying potential sources of financial support and training opportunities. Global networking should be catalysed and supported by the international community, including multilateral and bilateral donor agencies and technical assistance institutions. The Panel called on CSTD to initiate, in coordination with the Consultative Group on International Agricultural Research (CGIAR), the World Bank/Food and Agriculture Organization (FAO)-based Global Forum on Agricultural Research, and other partnership-promoting organizations, a dialogue between all stakeholders involved in biotechnology, including international organizations, NGOs and the private sector. It also discussed other issues of global concern, such as the possibilities for benefiting from biodiversity and preserving it and the impact of an introduction of "terminator gene" technologies into agricultural seeds.

4. In discussing constraints in advancing biotechnology in many developing countries, experts pointed to the following impediments:

i. lack of, or vague, policies in science and technology (S&T), particularly in biotechnology;
ii. lack of adequately trained manpower in biotechnology;
iii. poor access to up-to-date information on new concepts and techniques;
iv. inadequate funding for research and development(R&D);
v. strong and restricted protection mechanisms of biological resources.

5. In many developing countries, interest in biotechnology is still largely confined to the public sector, mainly in universities and government research institutions. Participants stressed the need to involve and engage the private sector. There was agreement that if commercialization were to be an imperative in the development of biotechnology in developing countries, a number of approaches to commercialization would have to be considered. These include educating the industry and investors on the potential benefits of biotechnology; encouraging industry and private sector participation; developing linkages between industry, investors and the scientific community; and providing incentives to R&D personnel in commercialization ventures.

6. In discussing the policies that need to be developed to advance biotechnology in developing countries, the Panel recommended that Governments in those countries should undertake the following strategies:

i. strengthen research capability and build endogenous capacity in biotechnology;
ii. embark on programmes to train skilled manpower at the tertiary as well as at the technical support levels;
iii. identify and encourage the development of "centres of competence" in biotechnology in each country;
iv. develop and maintain strategic alliances and networking with "centres of excellence" in developed countries;
v. encourage linkage and interaction between the public and the private sectors;
vi. identify, develop, and disseminate balanced information on biotechnology, intellectual property rights (IPR) and biosafety;
vii. develop case study approaches to address technology/IPR/biosafety issues in a practical, understandable and concrete way.

7. In support of national and regional initiatives to promote appropriate use of biotechnology in developing countries, the Panel re-emphasized the need for cooperation between UNCTAD, FAO, the United Nations regional economic and social commissions, the World Bank, non-governmental organizations (NGOs), and other international institutions such as the CGIAR and the Global Forum on Agricultural Research.

1. Introduction

8. Pursuant to Economic and Social Council resolution 1997/62, the CSTD was requested to convene a panel meeting on biotechnology and its impact on development, with particular attention to food production, for the purpose of identifying critical issues relevant to development that are not sufficiently covered by existing forums and recommending how further work on those issues might be undertaken. The Panel Meeting was held on 21-22 January 1999, in Geneva. It comprised Commission members, other biotechnology experts and members of United Nations agencies. The UNCTAD secretariat prepared an issues note entitled "Biotechnology for food production: issues for consideration"(E/CN.16/1999/Misc.2), which provided background information and identified critical issues relevant to development.

9. The issues paper recalls that global food demand is expected to double over the next 50 years and argues that conventional food production technology alone will not be able to meet this demand and that biotechnology could be an important vehicle for developing countries to meet the objectives of food sufficiency while at the same time safeguarding the environment. Modern biotechnology -- ranging from plant tissue and cell cultures to the transfer of genetic material between plant or animals -- has expanded the tools available for crop and animal improvement. It offers possibilities for short-circuiting traditional trait selection processes and overcoming conventional barriers of genetic incompatibility. It can also contribute to increasing food sufficiency through improving the genetic potential of varieties and animal species, by minimizing cultivation stresses and enhancing certain characteristics such as nutritional content and post-harvest shelf-life. Moreover, since it is scale-neutral, it could be used in small-scale farming, which constitutes the backbone of most developing countries' agriculture industry. However, the experts warned that biotechnology cannot be expected to be a panacea for all problems related to food production.

2. Species and traits: techniques and applications relevant to developing countries

10. The Panel noted that research to date has focused predominantly on temperate zone crops and on farming conditions prevailing in industrial countries. Biotechnology-related knowledge regarding certain crops, which are staples in the traditional diet of most people in developing countries, is still limited. In view of the prevalence of small-scale farming in most developing countries' agricultural sector, biotechnology could be used to improve mixed-farming and to best preserve the natural ecosystems. Special consideration should be given to "orphan" crops and to underutilized species, since a broad-based botanical resource could provide more possibilities for creating new improved strains and novel food sources.

11. Some experts noted that the "first generation" of genetic engineering applications in agriculture was aimed at improving traits involving single genes. To a large extent, this process has been driven by the commercial interests of firms. It has resulted in the development of pesticide or herbicide varieties that did not necessarily fit the needs of developing countries. Some of the traits that could make a difference in developing countries' agriculture, such as protection against certain pests and increasing stress-tolerance, often involve more complex gene transfers. The development of these technologies were within reach of some developing countries. The more technologically advanced developing countries could serve as regional centres of excellence for the development and use of biotechnology that meet the needs of developing countries.

12. It was also pointed out that there were biotechnology research laboratories in Europe working on tropical crops. The experts emphasized the

need, frequently expressed by others, for networking with such biotechnology initiatives. To illustrate the merits of link-ups with more advanced scientific centres, the case of the successful biotechnology production of interferon, which resulted from linkage between laboratories in Cuba and Finland, was given. Another example cited was the Institute for Genomic Diversity at Cornell University, United States, which has been established to develop and apply genomic technologies and computational tools for the conservation, evaluation and utilization of plant genetic resources worldwide. It will provide a site where scientists from both public and private sectors can meet to address germplasm issues and related policies, as well as to receive exchange experiences. Its membership currently includes several CGIAR centres, the national research institutes of Brazil, China and India and the United States Department of Agriculture/Agricultural Research Service (USDA/ARS).

13. The "Green Revolution", it was recalled, had caused the disappearance of original parent crop strains. It is thus important to preserve native species in tandem with the development of a biotechnology programme. An inventory of genetic resources might be undertaken as a first step, followed by a carefully planned and thoroughly executed strategy on the optimum exploitation and use of local genetic resources. In the discussion an expert noted that tropical and subtropical biodiversity and ecosystems remained largely understudied and unmapped. Therefore, the introduction of genetically modified organisms might have consequences different from those observed under laboratory conditions or field-tested in temperate regions. Cases of clandestine testing were cited, and the Panel urged that developing countries be advised to take precautionary measures, including the use of legal instruments, to discourage such an eventuality. Where testing is called for in national biotechnology programmes, security measures should be taken and developments monitored closely.

14. A number of areas where biotechnology could make a contribution were discussed. It could be used to improve tree varieties in order to strengthen their roles as sources of food, lumber and other raw materials. It could also be modified to facilitate and accelerate reforestation, which among other things would result in improved climate conditions favourable to farming. Livestock and dairy products are important food sources, but animal husbandry in developing countries has been rather limited. Biotechnology techniques have been used in industrialized countries to shorten the period of maturity, optimize milk yield and immunize animals against common diseases, as well as to expand and improve the materials used in the industrial processing of animal feed. The Panel pointed out the untapped potential of micronutrients for resolving food shortage and malnutrition.

15. Another area of importance is the change towards agricultural practices that do not damage the environment. For example, tropical soils are extremely susceptible to erosion. Over the past 50 years, some 25 per cent of the topsoil on earth has been lost around the world, mainly in tropical areas. However, since tropical countries may face a food shortfall, efforts should be made to improve agriculture productivity, and this will best proceed through a better understanding of the ecology of tropical soils. This is especially true for mixed cropping on small farms. The Panel saw a need for a new strategy involving the development of biotechnology alternatives that help to minimize or even eliminate many of the environmental problems caused by current agriculture practices, with a view to identifying them at both the regional and country levels.

16. The Panel emphasized the need to find solutions to the negative environmental impacts of traditional forms of agriculture, such as monoculture, soil tillage and irrigation on a country-by-country basis. Such programmes should stress the need for technologies focusing on improving the quality of life of small farmers and marginal communities and on regional

agriculture.

17. Progress also needs to be made to better understand the traits that would best address the farming needs and geo-topographical conditions prevalent in developing countries' agriculture. Of primary importance to many developing countries, for instance, would be the reclamation and cultivation of areas considered non-arable under conventional agricultural methods. The carrying capacity of productive farmlands would not be jeopardized through overuse if new territories were brought into cultivation through the use of new plant varieties with enhanced traits. Such traits could include salinity and alkalinity tolerance for island and coastal countries; adaptability to conditions in drought-prone areas, such as sub-Saharan Africa and areas ruined by overgrazing; and enhanced biological nitrogen-fixing capacity of bacteria. Developing countries beset by similar geo-agronomic problems might pool their capacities and resources together to resolve these specific problems.

18. In discussing traits and techniques, one expert pointed out that traditionally many agro-businesses have been choosing "cash crops" and "cash genes" for commercial applications. As a result, crops that have received more attention for commercial reasons have not necessarily been those of importance to developing countries' farmers. Another expert noted that the lack of incorporation of wild and primitive crop relatives has already caused a lag in increasing productivity and a narrowing of the germplasm base. A change in crop breeding is needed in which direct evaluation of useful genes replaces an inefficient and sometimes even misleading search for useful phenotypes. Direct evaluation of useful genes is possible using the tools of modern biotechnology.

3. Policies and institutional capacity-building

19. At the outset of the discussion, it was pointed out that the traditional channels for agricultural research and applications for many developing countries have been eroded by diminished development assistance funding and curtailed domestic public spending and that the private sector has taken on a more active and dominant position in this area. Biotechnology acquisition of most developing countries has often come from a local subsidiary's import from its parent company in industrialized countries. As a consequence, the type of techniques imported and their applications are often based on commercial considerations and may not always be in line with the national priorities or local needs of developing countries. Furthermore, due to media attention to novel biotechnology developments (for example, in genetic engineering), some policymakers have adopted the notion that biotechnology *per se* is a high-technology tool, exclusively in the hands of the private sector and not able to be mastered by developing countries. Many Governments have consequently adopted a resigned "hands-off" approach in this matter. It was stressed, however, that biotechnology need not be "high-tech" to be useful to poor countries. A biotechnology effort focused on the agriculture of the poor could do wonders to eradicate poverty. Similarly, food processing and preservation technologies can be quite constructive. The Panel advised Governments to determine and influence the pace and type of biotechnology used within their borders and stressed that public support in the form of clearcut policies and incentives, or in the form of financial and infrastructural assistance, could serve as a catalyst in the acquisition and adaptation of biotechnology. Policies and institutional support and linkages related to biotechnology also need to be complementary to, and part of, the overall national agricultural strategy.

20. Building a national capacity for biotechnology research and application requires policies that stimulate investment in biotechnology research and its application, institutional support structures, and the development of local research capacity in biotechnology as well as its integration into the

entrepreneurship and competition. However well defined they may be, policies are ineffective if they are not coupled with action-oriented strategies focused on specific areas such as acquisition, adaptation, monitoring and risk assessment.

21. In this connection, the roles of the different economic agents could be assessed and monitored to develop a coherent and appropriate biotechnology programme in line with the national development agenda. These economic agents could include not only commercial entities, such as seed factories and outlets, but also farmers as purchasers and consumers. Knowledge of the agricultural, industrial and commercial structures could be used in policy formulation, not excluding the possibility of interchanges in functions. Traditional academic and research institutions, for instance, could take on the role of commercial outlets for biotechnology products and techniques, and vice versa. Furthermore, the private sector could assist traditional funding sources in bridging the gap in R&D. To optimize use of resources and ensure effective participation of all stakeholders, cross-sectoral approaches in policy formulation and strategic planning should be taken.

22. The Panel highlighted the importance of traditional crops, which the livelihood of many small-scale farmers depends on and which are a source of foreign exchange earnings (e.g., coconut, palm oil) in many developing countries. If measures are not taken to improve competitiveness to achieve higher yields and lower production costs, these products can eventually be replaced by substitutes. Thus, in addition to the economic consequences, a people's alimentary tradition and culture could be threatened.

23. It is therefore important to integrate biotechnology research into national agricultural research activities. It is also important to consider the successful transition from research to commercialization is assured and the demand structure of users. Planning can include marketing prospects at home and abroad, as well as potentials for expanded use of agricultural produce in food processing and other industries.

24. Given the strong likelihood that biotechnology will become an increasingly important force in food and pharmaceutical production in the future, the Panel re-emphasized the importance of its integration into the national development programme. Central to this is the development of national R&D and risk assessment capacities which allow each country not only to pursue its own development path but also to protect its own genetic resources and food production sector. The transfer of biotechnology specimens, even between seemingly similar agronomic conditions, may still require adaptation. Such is the case of a high-performance nitrogen-fixing bacteria developed and used in Brazil. When transplanted to Cuba, the bacteria did not show its nitrogen-fixing properties.

25. In concluding the discussion on this theme, the Panel urged that in-depth studies on the socio-economic impacts of biotechnology be undertaken. Ecological studies are also needed to better understand the impact of biotechnology on biodiversity. These are important subjects that have not been studied thoroughly. The CSTD, through UNCTAD, can play a major role in monitoring product displacements or variety disappearance due to the use of biotechnology, as well as its effect on employment, rural development and food sufficiency.

4. Information, cooperation and networking

26. There was a strong agreement that ready access to information and networking for the acquisition and diffusion of biotechnology as well as public awareness of its potential benefits are vital requirements for the advancement and commercialization of biotechnology. The Panel was of the view that both horizontal and vertical networking are essential; horizontal

networking among countries of similar topographical characteristics will eliminate duplication and stimulate research, whereas vertical networking with more advanced countries can lead to access to newer and more up-to-date technologies and training opportunities. To date, there has been no adequate assessment of the policies, networks, institutions and other supporting infrastructures required to promote the development, diffusion and assimilation of new techniques in biotechnology.

27. While a vast array of biotechnology knowledge has been acquired over the years, little information has been transmitted to the public. Some experts noted the slow transfer of technology and knowledge to developing countries. Others attributed the gap between the pool of available and accessible biotechnology and its low rate of diffusion to developing countries to the fact that such technologies are protected by IPRs. Over the years science has flourished because of the free flow of information around the world. Now, however, because of the strengthening of IPR rules and the growing importance of commercial deals between the major players in biodiversity, there is a risk that IPRs are restricting the free flow of information and limiting the ability of countries to participate fully in the exchange of knowledge and information. Thus, more information on the impact of IPRs on the transfer of technology is needed, as there is very little empirical evidence to support the view that strong IPRs are required to facilitate the transfer of technology, as is frequently claimed. It was further stated that, while weak IPRs may hinder technology transfer and investment, strong IPRs may not help promote them either.

28. The Panel said that international organizations and institutions as well as intergovernmental bodies such as the CSTD and UNCTAD could be instrumental in making biotechnology information available to countries concerned and in facilitating the transfer of technology. The large transnational biotechnology companies should also be encouraged to provide factual and balanced information on biotechnology. There is a need for the compilation of a roster of biotechnologies which are already in the public domain and do not require licensing. In this connection, it was recommended to use the World Bank/FAO-based Global Forum on Agricultural Research and its Internet-based information/communications tool, the Electronic Global Forum on Agricultural Research (EGFAR), as vehicles to foster networking and information flow/communication between all stakeholders. The Global Forum was recently created as an organizational framework to stimulate improved information flow, communications, and partnership-building among all stakeholders in agricultural research and development worldwide. Other international development bodies could also actively promote the transfer, adaptation and diffusion of biotechnology.

29. More efficient networking and the building of linkages between the private and the public sectors are needed in the area of crop improvement. For example, more efficient breeding programmes are needed. The Panel expressed the view that biotechnology initiatives and programmes in developing countries, particularly those supported by developed countries, should take into account these needs and priorities at both the grass-roots and R&D levels.

30. The Panel stressed the importance of South-South cooperation and networking and cited Brazil, China, India, and the Republic of Korea as examples of developing countries that have achieved high levels of R&D capabilities and acquired long experience in biotechnology applications. Biotechnology laboratories can be expensive to set up in all countries, and it was recommended that regional centres be established to facilitate biotechnological testing, identification and experimentation. Besides linkages among stakeholders at the country level and with agricultural institutions in other developing countries, efforts should be made to link up with and become counterparts to agricultural research institutes in

industrialized countries in order to access more advanced technologies. These arrangements can lead to a more informed and coherent selection of techniques to be acquired at favourable prices within a shorter time-frame.

5. Critical areas for further work

31. Advances in biotechnology have opened a new era for food production, and the evolution of science and technology has outpaced the development of laws and policies. However, the implications of advancement in this new technology, especially in the area of biodiversity, biosafety, IPRs, production patterns and other critical factors are not yet sufficiently understood. The Panel discussion attempted to shed more light on some of the areas which have generated much of the controversy and debate surrounding modern biotechnology:

(i) *Biosafety*: Some experts pointed out that negotiations among the member countries of the Organisation for Economic Co-operation and Development (OECD) have led to the formulation of safety guidelines intended primarily to prevent the spread of harmful laboratory-created micro-organisms into the environment. A global code of conduct for the release of organisms into the environment has been developed within the framework of the United Nations Industrial Development Organization (UNIDO). Nevertheless, there has been continued concern over reported violations of the safety measures. It was noted that countries are sometimes uninformed of the potential benefits and risks of this new technology and often do not have sufficient capacity to enforce existing policies, regulations or guidelines governing its use. In discussing the options available to developing countries to ensure biosafety, the Panel suggested that biotechnology innovations be made in tandem with research work on their impact on ecosystems, particularly tropical ecosystems which prevail in developing countries. Another facet should be consumer health and safety, which could include labelling of foods containing genetically modified organisms. It was also suggested that experiences with regard to breaches of biosafety and work on biodiversity be more assertively shared between regions, centres and countries.

32. One expert also pointed out that amidst announcements of controversial biotechnology experimentations and reports of illegal field-testing of artificially created plant specimens, the potential benefits of biotechnology in general and the safety in the use of more mature biotechnology in particular are often overlooked. Fear and controversy arise from lack of information, often fuelled by sensationalism. Like other scientific knowledge, biotechnology is an evolving process that is still fraught with unknowns. However, there should be a concerted effort to provide frank, honest and balanced information on the state of biotechnology, its uses and benefits as well as its shortcomings and risks. The Panel invited countries to weigh their own food sufficiency problems against potential risks of biotechnology and against potential consequences of non-use.

(ii) *Biodiversity*: Like preceding technologies in the biosciences, biotechnology has influenced and will further influence agro-biodiversity. In the past, higher food production based on high-external-input varieties caused the loss of traditional varieties and their genetic diversity. Given certain conditions, modern biotechnology could strengthen this effect. In some developing countries, a combination of weak or nonexistent policies on the one hand and the efforts of private firms on the other has already stimulated a shift from food production for subsistence for local communities to large-scale production of few crops and varieties for national and international markets, resulting in a loss of diversity.

33. Modern biotechnology can preserve biodiversity. With minimal agro-chemical input and water intake requirements, biotechnology has more potential than conventional agricultural practices for safeguarding and in certain cases rehabilitating the natural habitat needed for ecosystems to exist. The Panel

stressed the need for safety testing of newly introduced biotechnologically designed crop varieties.

34. The Panel agreed that biodiversity was a resource which had hitherto been unprotected and taken for granted in many developing countries, and urged that gene banks be established to protect and preserve them. Furthermore, while most developing countries have natural resources, they often do not have the techniques to exploit them on their own. Carefully negotiated bio-prospecting arrangements could be one way to access techniques and know-how for cataloguing gene specimens and exploiting botanical resources within a national biotechnology programme.

35. With the Convention on Biological Diversity (CBD) Protocol being further negotiated, the Panel urged that developing countries' concerns be more effectively and strongly represented. The CSTD could facilitate this by establishing a working contact with the CBD secretariat and taking note of ongoing negotiations. Additionally, it could undertake and publish case studies with a view to promoting understanding of the Convention. In concluding the discussion on issues related to biodiversity, the Panel reiterated that, depending on their technological capacity in key areas such as risk assessment, developing countries need to develop their own basic regulations and to carry out risk assessment.

(iii) *The patenting of life forms*: Most new biotechnologies are proprietary and are therefore less accessible, in particular to researchers and users from developing countries. Patenting in itself is a complicated and expensive process. One expert noted that developing countries are often "patented out" of the whole IPR system. This has raised concerns among developing countries, especially since biodiversity in many such countries often provides large stocks of untapped genetic resources to be utilized in areas such as agricultural and pharmaceutical development.

36. It was pointed out that at present, the agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS) and the CBD sometimes seem contradictory in their objectives and practices with regard to access to and remuneration for plant genetic resources. It was important to understand clearly how these different agreements could be made compatible by linking IPR laws with non-IPR access and enumeration systems for plant genetic resources and how farmers' rights could be strengthened in this context.

37. The Panel expressed the view that this matter is very complex. Because IPR is a highly specialized area requiring legal expertise and consummate negotiating skills, it was suggested that an interface facility might be set up to patent, license and commercialize biotechnology techniques and ensuing products. This facility could also screen incoming products and techniques to ensure they are in line with national needs and conditions. In countries where they already exist, technology transfer centres could undertake these functions.

(iv) *Seed sterility variants, or "terminator gene"*: This technology's built-in gene sequencing renders seeds sterile and good for one-time use only. Patent holders have hailed it as a "technology protection system", which would ensure the continued development of new traits and technologies for commercial varieties by providing individuals and companies with a fair return on their investment. Certain NGOs, however, have dubbed it "terminator" or "traitor" technology in that it would terminate farmers' independence and threaten the food security of resource-poor farmers in developing countries where farm-saved seed accounts for an estimated 80 per cent of total seed requirement. On the one hand, by forcing farmers to use new seeds for each planting, this technology could facilitate the transfer and use of improved and better-adapted strains and varieties. On the other hand, seed-saving is considered necessary for farmers to adapt the seeds to their own needs and to local

conditions, thereby generating and nurturing biodiversity. It also ensures that fragile distribution and financing systems common in the developing world do not lead to a crisis in food production if seeds cannot be obtained in time for planting. Other uncertainties related to the use of this technology are potential gene-jumping to wild species and unintended transborder transfer to adjacent countries. The Panel stressed the need for more research and studies in order to better understand the benefits and drawbacks of the technology and its socio-economic impact in developing countries.

6. Recommendations

38. The Panel raised a number of issues that resulted in specific recommendations to both Governments and the international development community in terms of policy options and guidelines for different stakeholders involved in advancing the proper use of biotechnology for food production. The Panel recommended the following strategies:

- Identify, develop and disseminate balanced information on biotechnology, IPRs and biosafety. This could be done through the distribution of a series of concise leaflets on biotechnology providing a balanced view of the issues in easily understood language, to be disseminated to stakeholders in biotechnology development, including acquisition, deployment and improvement in developing countries;

- Undertake studies on the relationships between IPRs and technology transfer and develop a case study approach to address technology/IPR/biosafety issues in a more practical, understandable and concrete approach;

- Encourage networking and linkages between the public and private sectors and encourage interaction between industry, investors and the scientific community; this could be organized jointly with the Global Forum on Agricultural Research and the CGIAR;

- Build endogenous capacity and strengthen research capability in biotechnology through training skilled manpower and providing incentives for R&D personnel; this should be coordinated with the World Bank, which is developing a new strategy to build national capacities in biotechnology throughout the developing world;

- The international community should support developing countries in their efforts to develop and diffuse biotechnology to provide food for their population;

- Encourage private-sector participation by educating the industry and investors on the potential benefits of biotechnology;

- Provide support for mechanisms encouraging private firms to adapt and apply new technologies, and find new ways of financing firm development, such as building venture capital industry in developing countries;

- Establish strategic alliances and networking with "centres of excellence" in developed countries and encourage interaction with pioneering initiatives, such as the Institute for Genomic Diversity, which was recently established at Cornell University, United States, to develop and apply genomic technologies and computational tools to the conservation, evaluation and utilization of plant genetic resources worldwide;

- The CSTD, through UNCTAD, should identify and initiate dialogues that involve the private and the public sectors, and NGOs, with a view to

fostering the exchange of information and ideas among scientists, policy makers, industry, and end-users. Such dialogues could also provide a forum to raise issues concerning global developments in biotechnology (e.g., IPRs, biosafety) and to stimulate frank discussions and raise public awareness of the potential benefits of biotechnology and other critical issues. This work could be done in cooperation with the EGFAR;

- The CSTD should also address the need for regulatory capacity-building in biosafety for all countries. International organizations such as the United Nations Environment Programme, UNIDO, FAO and the World Health Organization, as well as individual countries such as Australia, Canada, France and the United States, have been involved in major biosafety projects. The CSTD should disseminate the results of other efforts already under way and support those initiatives which have proved useful and helpful in designing national biosafety programmes suitable to local needs and priorities.

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A COMMON VISION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Note by the UNCTAD secretariat

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Introduction

1. The Economic and Social Council, in its resolution 1995/4, endorsed the recommendations adopted by the Commission on Science and Technology for Development (CSTD) at its second session, and invited the CSTD to consider ways and means of taking advantage of the twentieth anniversary of the Vienna Conference on Science and Technology for Development for the formulation of a common vision for the future contribution of science and technology for development. To this end, the CSTD organized, in December 1996, the first panel meeting of members of the CSTD which outlined specific areas that could be dealt with by expert group meetings as a basis for developing a common vision. The specific issues to be considered were:

(a) The concrete impact of science and technology on development; generic and sectoral policies;

(b) Capacity-building in science and technology, including aspects relating to conceptualization, experiences, management and the examination of new opportunities;

(c) The interaction of private enterprises, Governments, academic institutions and civil society groups with science and technology for development;

(d) Assessment of international cooperation networks and of the work of organizations active in the field of science and technology.

2. Some of these issues, in particular those related to item (a), were examined during the 1995-1997 inter-sessional period by the panel on a common vision. At its third session, the CSTD reviewed the work of the panel, having before it the following documents: (a) a note by the Secretariat setting out the background to the evolution of thinking on science and technology from 1963, the date of the first international conference on the subject, up to the 1979 Vienna Conference on Science and Technology for Development, and on the issues that have emerged in the 1990s (E/CN.16/1997/7); (b) the report of the December 1996 panel meeting (E/CN.16/1997/CRP.2); and (c) the summary of discussions at the workshop held at Ocho Rios, Jamaica, from 30 April to 2 May 1997 (E/CN.16/1997/Misc.1).

3. On the basis of the progress made, resolution 1997/62 of the Economic and Social Council recommended that the CSTD should carry out a programme of preparation on a common vision as set out in the report of the panel meeting of December 1996, by holding expert group meetings. Two expert group meetings were therefore held, the first in Addis Ababa, from 13 to 14 November 1997, and the second in Geneva, from 8 to 10 December 1998. The report of the latter meeting is available as document E/CN.16/1999/Misc.1, and contains a background paper by the secretariat which also includes the main findings of the Addis Ababa meeting.

4. The CSTD Bureau, at its meeting in Sliema, Malta, on 30 September 1998, decided that the outcome of the last expert group meeting should lead to a succinct report to be submitted to the fourth session of the CSTD for its consideration. The report should synthesize the views of the CSTD on its vision of the role of science and technology in development for the twenty first century and should be widely disseminated. To be known as the "Vision statement", it could be presented at various forums, including the World Science Conference organized by UNESCO (to be held in Budapest, from 26 June to 1 July 1999). This document has been prepared pursuant to this decision, while a more detailed background report prepared by a consultant is contained in document E/CN.16/1999/CRP.1.

The Vision Statement

5. The triumphs of scientific discovery and technological innovation of the past two decades have greatly increased our understanding of the world we live in and the benefits we derive from it, but these benefits have been unevenly distributed across nations and within them. The process of rapid accumulation of knowledge and skills evident in some parts of the world has not reached the hundreds of millions of people still living in absolute poverty, nor has the progress of science and technology been without impact on the resources that are our common heritage. The resulting knowledge gap between the North and the South has therefore grown wider, making it even more difficult for the Governments of the South to fulfil the needs and aspirations of their peoples.

6. We believe that one of the central issues of the coming millennium will be the need to build capacity in developing countries so that they can adapt to the challenges of continuous change. In pursuing this goal, the United Nations Commission on Science and Technology for Development (CSTD) is committed to the common vision of a global entitlement to knowledge and to the benefits of science and technology for development in the twenty-first century. Achieving this objective will require universal access to information and to financial and technical resources, as well as the ability to use them constructively.

7. To achieve this, it will be necessary to formulate national policies and establish international arrangements that safeguard and protect the interests of all people on the planet as well as those of future generations. Individual States and the United Nations system as a whole must work towards this end.

8. While globalization and liberalization have brought with them new competitive requirements for firms everywhere in the world, they have also put greater pressure on Governments to become more innovative in policy design, and to pay more attention to policy coherence and to the impact of their policies on people and the environment. Greater efforts, therefore, will be needed to develop new types and sources of information and hence a more transparent and participatory policy-making process. Society as a whole must become a learning institution.

9. In moving towards a world in which the benefits of scientific and technological change are spread widely across society, States will increasingly be called upon to motivate and interact with a larger number of actors than in the past, for the process of innovation is interactive and system-wide. Strengthening national and local systems of innovation and ensuring that their outcomes enhance general welfare will therefore require close cooperation between actors, ranging from governments - at both national and local levels - and the scientific, research and development and business communities to non-governmental organizations and other segments of civil society. The UNCTAD secretariat, under the guidance of the CSTD, should contribute to this process by continuing to assist Governments from developing countries governments in reviewing the effectiveness of their national and local systems of innovation, and by making available information on how such linkages are created and sustained.

10. The ability of economic and social actors to generate and absorb new knowledge is fundamental to the dynamic functioning of innovation systems. In the area of education, priority should be given to: (a) the elimination of illiteracy; (b) increased investment in higher education, especially engineering and science; and (c) the promotion of vocational training. Collaboration with the private sector would be helpful in matching skills and needs.

11. The goal of universal access to basic education for all women, in view of their vital role in many aspects of society and the economy, is particularly important to the process of using and diffusing new knowledge. New policies and services will be needed to bring women into the mainstream of technological change in the new millennium. To achieve that, it will be necessary to remove the obstacles that women encounter in obtaining a university education, pursuing a career in science and engineering, and participating in the decision-making that shapes the direction of scientific and technological change and, more broadly, determines its impact on development efforts. Governments will need to take the lead in making fuller participation by women a reality.

12. The world of the twenty-first century will be one in which knowledge generation increasingly takes place within the networks of large transnational corporations. In such a world, there will be opportunities for the monopolization of scientific and technological knowledge and the potential to restrict the free flow of information. It will be necessary to provide greater support for research in the public sector particularly in the areas of health and agriculture, in order to make sure that local interests and needs are acted upon, to encourage the further development of indigenous knowledge systems, and to increase capacities for the assimilation of transferred technology. Research institutions, however, cannot be expected to play both a long term public research function and an entrepreneurial role aimed at short-term objectives. It will be necessary to create and support intermediary institutions, in order to build linkages between the users and producers of knowledge in developing countries, where enterprises are small, their capacity to seek and evaluate information weak, and their in-house development capabilities limited. National and local Governments all have a role to play in this process, as do international educational and research networks.

13. In the world of the twenty-first century, nations and their economies will be more than ever embedded in a vast array of international institutional arrangements and economic, scientific, technological and social interactions. These, we believe, are critical vehicles for acquiring the knowledge and information required for development. As only a small minority of developing countries have succeeded in attracting significant inflows of foreign investment, more attention will need to be given to alternative channels for acquiring know-how from external sources, such as supplier-customer linkages, licensing, alliances, partnership arrangements and networks for joint research and development, production and distribution. Thanks to these linkages, exporting has proved a highly effective means of acquiring technological capabilities. The international community has a role to play in creating new mechanisms to support the flow of technology and in assisting developing countries to become more attractive both to foreign investors and to potential trade and technology partners.

14. To build local technological and productive capabilities, greater flexibility will be needed in international trade, investment and intellectual property agreements. With regard to trade, the implementation of the Uruguay Round agreements needs to be flexible enough to permit some protection, of limited duration, for infant industries considered as having export potential. Formal negotiations on such arrangements may be necessary. As the coverage of patent and copyright protection expands ever more widely to include life forms and data banks, there is a need to raise the legitimate question of whether a proper balance is being struck between providing an incentive to invest in knowledge creation and maintaining the tradition of openness and free exchange of scientific information upon which such systems are based. In revising their legislation on the protection of intellectual property rights in line with the Agreement on Trade-related Intellectual Property Rights, developing countries should take advantage of the freedom the Agreement gives them to adopt provisions that not only protect inventions but also promote the transfer and

development of technology and take into account the social impact of technological change. We believe that an ongoing review and evaluation of the impact of the Agreement on strengthening the knowledge base and on development in general would be useful in this respect. The CSTD, in cooperation with the World Intellectual Property Organization (WIPO), UNCTAD, the World Trade Organization (WTO) and other international agencies, could contribute to this process.

15. The consequences of any technological innovation in the next century can no longer be viewed solely in terms of its benefits to specific groups or organizations, but should be assessed in terms of its full economic, social and environmental impact on society at large. The assessment needs to be carried out with the full participation of all those concerned. Among the many science- and technology-related topics about which the public has a right to be informed and heard are climate change and the consequences of advances in genetic engineering and in information and communications technologies. Scientists, including social scientists, in developing countries only rarely have the capacity and funding to carry out systematic, multidisciplinary impact analysis and risk assessment. International cooperation can be useful in providing assistance in this domain, including in building capacity in developing countries. The CSTD would be prepared to organize impartial forums at which biosafety and risk assessment in the field of biotechnology, and other issues arising from new technologies, could be discussed. More importantly, Governments should consider establishing appropriate mechanisms whereby representations of not only business, Governments and the scientific community but also non-governmental organizations, women's groups, minorities and the public-at-large can be invited to exchange views on the scientific, social and ethical issues of major concern. These are the challenges that will be posed by change in the twenty-first century; they are the challenges facing science and technology if it is truly to serve the goal of sustainable development.

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FOR DEVELOPMENT
Fourth session
Geneva, 17 May 1999
Item 4 of the provisional agenda

A COMMON VISION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Note by the UNCTAD secretariat

Para 4. For .... is contained in document E/CN.16/1999/CRP.1.

read .... is contained in document E/CN.16/1999/Misc.4.

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Geneva, 17 May 1999
Item 5 of the provisional agenda

BUDGET AND INTER-SESSIONAL ACTIVITIES OF THE COMMISSION

Note by the secretariat

GE.99-51270

1. The Economic and Social Council, in resolution 1997/62, recommended that at future sessions of the Commission on Science and Technology for Development (CSTD), the report on budget and inter-sessional activities be considered under a separate agenda item. In accordance with Council decision 1997/306, by which it approved the provisional agenda of the fourth session of the CSTD, the report on budget and inter-sessional activities is to be considered under agenda item 5.

The budget of the Commission (1 January 1998-28 February 1999)

2. Table 1 provides an account of the appropriations and expenditures for CSTD activities under the regular budget and of the income and expenditures for CSTD activities covered by extrabudgetary resources. The report covers the period 1 January 1998 to 28 February 1999. Under the 1998-1999 programme budget of the United Nations, the CSTD has an appropriation of US$ 352,500, to be used for the travel of members to attend the fourth session as well as for the travel and subsistence allowances for the working groups and panels established to prepare the inputs for the Commission's fourth session. From the regular budget, US$ 152,500 was set aside to pay for the travel of Commission members to participate in the fourth session, and US$ 200,000 was allocated for the activities of the working groups and panels. In view of the changes in the membership of the Commission, twice during the inter-sessional period, the Working Group on scientific and technological partnerships and networking for national capacity-building (main theme) met only once. Thus, the cost of the Working Group on the main theme came to only US$ 48,733. During the reporting period the CSTD held two more meetings, namely, the last meeting of the Working Group on the common vision for the future contribution of science and technology to development, and the panel meeting on biotechnology and its impact on food production, the cost of which came to US$ 55,520 and US$ 23,430 respectively. An amount of US$ 50,000 has been set aside for a first meeting of the Working Group that will be established to prepare the inputs for the Commission's fifth session, leaving a balance of US$ 22,317. For budgetary purposes all funds will need to be actually spent before the end of 1999.

3. With regard to extrabudgetary resources, the available resources for CSTD activities came to US$ 183,202.23[1]. As shown in Table I, the amount of US$ 161,078.23 was the balance from the trust fund that had been set up with contributions from the Government of the Netherlands (Dutch Fund) to cover the 1995-1997 inter-sessional activities. In early 1998, the Chairman of the CSTD requested the Government of the Netherlands to consider the extension of the trust fund in order to complete unfinished work and to use the balance for some new activities, namely, the first meeting of the Working Group on the main theme. The Government of the Netherlands gave its approval in November 1998. An additional US$ 22,124 was contributed by the Government of Austria.

4. As can be seen from Table I, US$ 76,187.03 was used for the science, technology and innovation policy reviews (STIP) (Ethiopia and Jamaica), US$ 21,577.25 for the purchase of copies of the publication "Knowledge Societies: Information Technologies for Sustainable Development" and US$ 20,000 for the publication of the reports on the coalition of resources for the development of science and technology. All these activities had been approved and planned by the previous Commission. The amount of US$ 45,500 earmarked for the meeting of the Working Group on the main theme has not been used, as the meeting took place in September 1998 and the approval from the Government of the Netherlands was not communicated to the secretariat until November. The Dutch Fund will be terminated on 30 June 1999 and the use of the balance for other purposes will again require approval from the Government.

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[1] This amount is net of support costs.

5. Finally the amount of US$ 22,124 has been used for the preparation of the report on the evaluation of best practices in networking.

Inter-sessional activities of the Commission

May - December 1997

6. Three meetings were held as follow-up to the third session of the CSTD[2]. These are:

- Expert Group on common vision for the future of science and technology for development, Addis Ababa, 13 - 14 November 1997;
- Workshop on the coalition of resources for the development of science and technology, Addis Ababa, 17 - 18 November 1997; and
- Bureau meeting, Addis Ababa, 15 - 16 November 1997.

January 1998 - February 1999

7. The meetings held during the current reporting period are the following:

- Working Group on partnerships and networking, Sliema, Malta, 28-30 September 1998;
- Expert Group on common vision, Geneva, 8-10 December 1998;
- Panel meeting on biotechnology and its impact on development, 21-22 January 1999; and
- Bureau of CSTD, Sliema, Malta 30 September 1998.

8. Table 2 shows all the meetings held during the fourth inter-sessional period, from May 1997 to the end of February 1999. For each meeting it gives the names of participating Commission members and other participants from the United nations system, civil society and academia.

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[2] These meetings were charged against the 1995-1997 inter-sessional budget. A report on the revenues/expenditures for this period is contained in document E/CN.16/1997/CRP.3. The cost of the Expert Group on the Common Vision came to US$ 32,363 and was charged against the regular budget under "Panel meetings", which showed a balance of US$ 59,144. Funds remaining in the regular budget at the end of 1997 were returned to Headquarters. The cost of the Bureau Meeting and the Workshop on Coalition of Resources came to US$ 42,625 and was charged against the Dutch Trust Fund under "Bureau meetings", which showed a positive balance of US$ 54,898. The balance of the Dutch Trust Fund was brought forward and has been used as reported in the present report.

Table 1
SUMMARY OF OVERALL CSTD BUDGET
1 January 1998-28 February 1999
(in US$)

I. REGULAR BUDGET

ITEM	APPROPRIATION[1]	EXPENDITURE	COMMITTED	PLANNED	BALANCE
i) Travel of participants to the 4th sessions of CSTD	152,500	-	-	152,500	-
Subtotal	**152,500**	-	-	**152,500**	-
ii) Panel meetings	200,000	-	-	-	-
a. Working group on Partnering and Networking	-	48,733	-	-	-
b. Panel meeting on Vision Panel for the Future	-	56,520	-	-	-
c. Biotechnology Panel	-	23,430	-	-	-
d. Panel related to main theme of fifth session	-	-	-	50,000	-
Subtotal	**200,000**	**127,683**	-	**50,000**	**22,317**
Regular budget subtotal	**352,500**[1]	**127,683**		**202,500**	**22,317**

II. EXTRA-BUDGETARY RESOURCES

ITEM	INCOME	EXPENDITURE	COMMITTED	PLANNED	BALANCE
1. DUTCH FUND[2,3,4]					
A. Science, technology and innovation policy reviews (STIPs)	75,578.23	76,187.03			-608.80
1. Consultants fees	-	44,440.00	-	-	-
2. Travel of consultants	-	9,837.66	-	-	-
3. Travel of UNCTAD staff	-	20,472.38	-	-	-
4. Miscellaneous	-	1,437.00	-	-	-
B. Information technology activities	20,000.00	893.25	20,684.00	-	-1,577.25
1. Cost of purchase of 1900 copies of ICT publications	-	-	20,684.00	-	-
2. Freight costs for 500 copies purchased by the UN	-	893.25	-	-	-
C. Coalition of resources	20,000.00	-	-	20,000.00	-
D. Main substantive theme	45,500.00	-	-	-	45,500.00
E. Miscellaneous	-	331.71	-	-	-331.71
F. Adjustments	-	-2,349.04	-	-	2,349.04
DUTCH FUND Subtotal	161,078.23	75,162.95	20,684.00	20,000.00	45,231.28
2. AUSTRIAN FUND[2]					
Evaluation of networks	22,124.00	18,750.00	-	3,374.00	-
a. Consultants	-	18,750.00	-	-	-
b. Printing of report	-	-	-	3,374.00	-
AUSTRIAN FUND Subtotal	22,124.00	18,750.00	-	3,374.00	-
EXTRA-BUDGETARY Total	183,202.23	93,912.95	20,684.00	23,374.00	45,231.28

[1] Appropriation at 1998 exchange rates.
[2] Net of support costs.
[3] Revised budget as of November 1998.
[4] Total includes balance at 31.12.97 of US$110,021.78, interest earned in 1998 US$6,088.03 and the second instalment of US$44,968.42 (not disbursed as of 28.02.1999).

Annex

Inter-sessional activities of CSTD

Expert Group Meeting on common vision for the future contribution of science and technology

Addis Ababa, Ethiopia, 13-14 November 1997

Agenda

1. Opening statement
2. Channels for interaction between enterprises, Governments, academia and research bodies, NGOs and other members of civil society, including the role of national S&T councils - formal and informal channels
3. Setting of government priorities with regard to S&T development
4. Support mechanisms for strengthening innovation in agriculture and industry - the issue of effectiveness
5. The role of the CSTD in stimulating closer interaction among partners in development with regard to S&T issues
6. Discussion of possible conclusions and recommendations and further work

Participants

Members:

Mr. Carlos Aguirre
Mr. R.A. Boroffice
Mr. Asrat Bulbula
Mr. Naswil Idris
Mr. Luk Van Langenhove
Prof. Bernd Michael Rode
Mr. Arnoldo Ventura
Prof. George Waardenburg

Experts:

Prof. Chen Jie
Mr. Paschal B. Mihyo
Mr. M. Anandakrishnan
Mr. Fred Kakaire Nyende

Secretariat:

Mr. K. Aning
Ms. Lynn Mytelka
Mr. Vladimir Pankov

Workshop on coalition of resources

Addis Ababa, Ethiopia, 17 - 18 November 1997

Agenda

1. Opening statement
2. Coalition of resources for building and operating the transmission infrastructure. Overview and guidelines
3. General discussion
4. Financing the application of ICTs in education
5. General discussion

Working group sessions: Case study presentations

Working Group 1: transmission infrastructure - case studies:
Bangladesh, Ethiopia

Working Group 2: education - case studies:
Ghana, India, Indonesia, South Africa

Working Group 3: health - case studies:
China, Costa Rica, Kenya, Uganda

Plenary sessions:
Presentation of lessons learned and discussion of guidelines

Final recommendations and guidelines

Participants

Members:

Mr. A. Bulbula
Mr. M. Gbeasso
Mr. W. Hillebrand
Mr. G. Oldham
Ms. M. Ranga
Mr. A. Ventura
Prof. G. Waardenburg
Mr. M.M. Zafar

Experts:

Mr. B.S. Bhatia
Mr. F. Bukachi
Prof. Chen Jie
Mr. M. Lawrie
Mr. F.K. Nyende
Ms. F. Walker

Other organizations:

Mr. J.L. Hamel (ECA)
Ms. N. Halfkin (ECA)
ITU - Addis Ababa
Mr. B. David (Bellanet)

Representation:

Embassy of Switzerland in Addis Ababa

Consultants:

Mr. A. Crede
Mr. D. Goldshmidt

Secretariat:

Mr. K. Aning
Ms. L. Mytelka
Mr. T. Tesfachew

Bureau Meeting
Addis Ababa, Ethiopia, 15 - 16 November 1997

Agenda

1. Opening and agenda
2. Minutes of the Bureau meeting in Jamaica
3. Review of events - third session, including membership and position in the United Nations of CSTD
4. Present financial situation
5. Ongoing projects
6. Review of decisions taken at the third session. Preliminary work plan for inter-sessional period 1997-1999
7. Strategy for dissemination of reports of CSTD
8. New projects
9. Future financing of CSTD activities
10. Contact strategies
11. Other business

Participants

Bureau members:

Prof. G. Waardenburg, Chairperson 1995 - December 1997
Ms. M. Ranga
Mr. A. Ventura
Mr. M. Gheassor
Mr. A. Bolbula, Chairperson-elect (January - December 1998)

Member:

Mr. A. Hillebrand

Secretariat:

Ms. L. Mytelka
Mr. K. Anlog

Working Group on partnerships and networking for national capacity-building

Sliema, Malta, 30 September 1998

Agenda

1. Opening remarks
2. Introductory statement
3. Panel 1. General overview on partnership
4. Panel 2. Partnerships in the energy sector
5. Partnership on biotechnology
6. Lessons learnt and recommendations to CSTD for further work
7. Conclusions and adoption of the report

Participants

Members:

Mr. Ali Abaab
Dr. Kouadio Amani
Mr. Asrat Bulbula
Ms. Joseke Bunders
Dr. Galina Butovskaya
Mr. Alfred A. Van Kent
Mr. KongRae Lee
Dr. Titus Mteleka
Ms. Rolanda Predescu
Ing. Justo A. Quintero
Prof. B. Michael Rode
Mr. Arnoldo Ventura
Mr. M.M. Zafar

Experts:

Ms. E. Atzler
Dr. Ludovico Alcorta
Mr. Neils Busch
Ms. Joanna Chataway
Prof. Anton Eberhard
Mr. N.S. Vonortas

Other organizations:

Mr. Dirk Pilari (DESA)
Prof. B. McA. Sayers (WHO)
Mr. Omar Bizri (ESCWA)

Secretariat:

Ms. Helen Argallas
Ms. Lynn Mytelka
Mr. Mongi Hamdi
Mr. Dieter Koenig

Expert Group Meeting

Common vision for the future contribution of science and technology for development

Geneva, 8-10 December 1998

Agenda

1. Views on elements of a "Common Vision": Country perspectives
2. Global entitlement to knowledge
3. The changing role of the State in the development of science and technology
4. The role of networking and partnership in a multidisciplinary approach to science and technology
5. Other issues for consideration
6. Towards a common vision

Participants

Members:

Mr. C. Aguirre
Dr. G. Butovskaya
Dr. A. Kouaouci
Mr. T. Kuhn
Mr. KongRae Lee
Dr. J. Meyer-Stamer
Mr. C.O. Okuro
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Dr. V. Quevedo Rodriguez
Prof. B. M. Rode
Mr. A. Ventura

Experts:

Ms. E. Arrier
Mr. C. M. Correa
Mr. K.J. Engelhard
Mr. J. A. Fernandez Esteve
Mr. T. Ganiatsos
Ms. G. M. Malcom
Dr. B. Matasovian
Mr. M. Nagao

Secretariat:

Ms. H. Argaillas
Ms. E. Erb-Paniagua
Ms. G-V. Koch
Mr. D. Koenig
Mr. V. Pankov
Mr. P. Roffe
Ms. M.T. R. Florez
Mr. Y. Soubra

Panel Meeting

Biotechnology and its impact on development

Geneva, 21-22 January 1999

Agenda

1. Opening
2. Species and traits: techniques application and relevance to developing countries
3. Policies and institutional capacity-building
4. Other critical issues in biotechnology
5. Identification of critical areas for further work

Participants

Members:

Dr. R. Castellanos
Dr. G. Mencinicopschi
Dr. G. Perez
Prof. A. Tsaftaris
Mr. A. Ventura

Experts:

Dr. E. Fontes
Prof. Z. Hamid
Ms. K. Stokes

Other organization:

Mr. P. Gregory (World Bank)

Secretariat:

Ms. R. Argallas
Mr. M. Hamdi
Ms. M. Masin
Mr. D. Koenig
Mr. J. de Castro

Bureau meeting

Sliema, Malta, 30 September 1998

Agenda

1. Opening
2. Reform of the UNCSTD
3. Progress of work
4. Follow-up to resolutions and decision of previous sessions
5. UNCSTD budget and inter-sessional activities
6. Other matters

Participants

Bureau members:

Mr. A. Bulzola, Chairperson (January - December 1998)
Ms. A. Pradeep
Prof. B. M. Mute
Mr. A. Ventura

Members:

Mr. KongPan Lao
Mr. M. M. Zafar

Secretariat:

Ms. H. Arnaldez
Mr. L. Mytelka

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COALITION OF RESOURCES

Note by the secretariat

GE.99-50991

Background

1. The need for the coordination and better focusing of donor support to developing countries through a "coalition of resources" has received wide attention in recent years. The concept of a coalition of resources covers finances as well as human and intellectual resources and logistical services that might be available to assist developing countries. It also involves a wide range of stakeholders, including the private sector and civil society.

2. In response to resolution 1991/73 of the Economic and Social Council and General Assembly resolution 46/179, a consultative meeting was convened in December 1994 to discuss the concept of a coalition of resources for science and technology for development and to explore possible ways and means of organizing such a coalition. The meeting emphasized, among other things, the need to ensure that a coalition of resources takes into account user/recipient needs and demands and individual donor mandates. It also stressed that instead of a single global coalition of resources, such as the one envisaged in the Vienna Programme of Action on Science and Technology for Development, it would be more effective to develop mechanisms that focused on specific and well-defined themes.

3. It was noted that the funding of activities related to science and technology depended largely on a spontaneous market-driven response by donors. Most of the existing coordination schemes by donors in the areas of science and technology have been organized on an ad hoc basis with no umbrella mechanism. A better understanding of the role of a coalition of resources as a funding mechanism and its application in the context of developing countries is essential. To that end, the Commission on Science and Technology for Development (CSTD) was requested to provide a forum for the exchange of views and interaction among partners on the mechanisms and strategies needed to bring about a coalition of resources for the development of science and technology in developing countries. This recommendation was subsequently endorsed by the Economic and Social Council in its resolution 1997/62, which recommended that the CSTD should convene a workshop on coalition of resources, particularly in relation to information and communication technologies (ICTs). The focus on ICTs provided an opportunity to build on earlier work of the CSTD which had highlighted the difficulties faced by some developing countries in accessing ICTs and in financing projects that contribute to the building of a national information infrastructure. A coalition of resources was viewed as critical in facilitating the capacity of developing countries, in particular the least developed countries and countries in transition, to gain access to ICTs and to promote the application of such technologies in development-related projects.

4. The main objectives of the workshop, which was held in Addis Ababa, Ethiopia, from 17 to 19 November 1997, were: (a) to generate dialogue among CSTD members and invited experts on the concept of a coalition of resources; (b) to find out more about existing schemes for the coalition of resources in the area of ICTs; (c) to examine the various channels available for networking between project managers, private sector finances and donors, including through the Internet; and (d) to develop guidelines and policy recommendations on coalitions of resources for financing the application of ICTs in the areas of transmissions infrastructure, health and education.

5. The workshop discussions were based on three working papers, each of which dealt with one of the main themes under consideration, namely: (a) coalition of resources for the application of ICTs in transmissions

infrastructure; (b) coalition of resources for the application of ICTs in education; and (c) coalition of resources for the application of ICTs in health.

6. In addition, presentations were made by participants in the workshop, which included CSTD members, experts in ICTs and experts in policy formulation, project management and financing.

7. The examples presented in the working papers and at the workshop show that the changes in the global economic environment in recent years have had a major impact on the way coalitions of resources for the application of ICTs are organized and on the role of different stakeholders.

8. Increasingly, coalitions of resources are acquiring a global dimension, with the active participation of and contributions by the private sector, technology suppliers and global service providers. However, in order to maximize opportunities for a coalition of resources in support of science and technology for development, there is a need to, inter alia, balance private and social profitability in project design; design a clear and transparent national policy framework and regulatory environment; and develop the capacity to inform potential investors, lenders, donors, equipment suppliers and service providers about specific opportunities to create new coalitions of resources in a particular location or jurisdiction.

Follow-up work on a coalition of resources

9. The working papers presented at the workshop raised a number of issues that require further exploration. For example, there is a need to explore further the concept of a coalition of resources in the current global environment. The Bureau of the CSTD has decided that the working papers and the overview, as well as a synthesis of the documents presented by the participants, will be published under the supervision of the UNCTAD secretariat. The publication is expected to be finalized and issued by mid-1999.

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1. In line with Economic and Social Council decision 1997/306, the Commission on Science and Technology for Development (CSTD) is to review at its fourth session the implementation of, and progress made on, decisions taken at its third session. Further to this decision, the present note has been prepared by the secretariat as a background document for the Commission's consideration of this agenda item. As action concerning most of the decisions at the third session will be discussed under separate items of the agenda, this note focuses on activities relating only to: a) the information and communications technologies (Economic and Social Council resolution 1997/62 A); the science, technology and innovation policy reviews (Economic and Social Council resolution 1997/62 B); and the Gender Advisory Board reviews (Economic and Social Council resolution 1997/62 D).

Information and Communication Technologies for Development

2. Resolution 1997/62 recommended that each developing country and country in transition establish a national strategy for information and communication technologies (ICT), taking in account, inter alia, the CSTD guidelines[1] and also that existing strategies be reviewed in the light of those guidelines. It further recommended that action be taken by national Governments to ensure that an entity, whether already existing or established for this purpose, be charged with the design and implementation of the national ICT strategy.

3. With a view to facilitating the exchange of experience at the international and regional levels, countries were also invited to prepare for the fourth session of the Commission a report on their ICT strategies. This report would include their respective priorities, the mechanisms for updating, and the procedures for implementing the strategy. The UNCTAD secretariat brought these recommendations to the attention of all States members of the United Nations (TDB 473/ICT of 21 March 1997). In addition, the member States of CSTD were requested to notify the secretariat if they intended to report on this subject to the fourth session. The Commission may wish to consider the preparation of a synthesis of national ICT reports submitted or presented by member States at the fourth session in response to this request.

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[1] For the guidelines see E/CN.16/1997/4.

Technology to translate the work

Science, technology and innovation policy reviews (STIP)

7. Economic and Social Council resolution 1998/4 requested the Commission and UNCTAD to liaise in establishing a programme of country reviews on science, technology and innovation policy (STIP) for interested countries[1]. The purpose of the reviews would be to enable participating countries to evaluate the efficiency with which their scientific and technological, as well as industrial, economic, educational and social institutions and mechanisms contributed to the development -- particularly technological development -- of their enterprises. The programme would be aimed at assisting participating countries to identify the strengths and the weaknesses of their innovation processes; to evaluate and strengthen the contribution of science and technology policies and institutions to the development of their productive sectors; and to elicit support from the international community in these efforts through the diffusion of the findings of the reviews. By enriching the pool of knowledge on the policy design and application, the reviews would also help other developing countries and countries in transition to improve their own policies while at the same time opening opportunities for effective international cooperation.

8. The first STIP country review, initiated at the request of the Colombian Government in 1996, has been successfully concluded. A second review was undertaken in Jamaica during the 1997-1998 period and has also been completed. Two more reviews, in Ethiopia and the United Republic of Tanzania, have been initiated and are at different stages of implementation. The requests for similar reviews by several other developing countries and countries in transition, including Romania, Costa Rica, Cuba, Venezuela and Myanmar, are currently being kept on hold pending availability of resources.

9. Following is a brief account of the progress made and of the findings of the four reviews now under way.

10. **Colombia.** The review was completed in 1997 and at the time of the preparation of the present report, the report on the STIP review in Colombia was being prepared for printing (UNCTAD/ITE/IPC/5, Sales No. E.99.II.D.11). A number of recommendations put forward by the review have

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[1] E/CN.16/1998/4 contains the objectives and mechanisms of STIP reviews.

already been implemented or are in the process of being implemented. Its impact on the local innovation community has been considerable. Of particular significance have been the recommendations relating to the adoption of new innovative mechanisms for research and development (R&D) financing, including: (a) the restructuring of current financing schemes for existing and additional R&D resources; (b) the transfer and allocation of sufficient resources for R&D and innovation in general; and (c) other public-sector initiatives reflected in the refocusing of public expenditures to take into consideration innovation activities and programmes. The national training agency (SENA) has been restructured to incorporate training for innovation. In addition, national bodies charged with the strengthening of intermediary institutions (e.g., standards and quality control institute, business support agencies) have been briefed and advised on innovation-related science and technology policies and on how such policies can be better integrated into the institutions. The response of both the public and private sectors to this exercise has been very positive and encouraging. At the time of the present report's preparation, a brief report on the current status of the implementation of the review's recommendations was expected.

(i) **Jamaica.** The second STIP review in Jamaica has been successfully completed and was released in March 1999 (UNCTAD/ITE/IPC/6, Sales No. E.99.II.D.5). It has already had a significant impact on the design of Jamaica's national innovation policy. Again, a number of recommendations proposed by the review team have already been adopted, particularly in the information technologies (IT) sector. Eight projects covering the fields of education, technology and entertainment have been designed and are at the implementation stage. These stem directly from the review. Currently, the National Commission on Science and Technology is considering and seeking resources pertaining to the recommendations made in the entertainment sector, particularly music, and in the agro-business sector. The national system of innovation in Jamaica is in the process of being developed and, as proposed by the STIP review, will feature the integration of the country's national institutions.

(ii) The STIP review has also given rise to other activities. As a follow-up to the review, a subregional project entitled "Becoming a global player: opportunities in the music industry for developing countries" has been initiated. Several other Caribbean countries, including Cuba and Trinidad and Tobago, have shown interest in this project. A July 1999 fact-finding mission confirmed the findings of the STIP review. Currently, resources are being sought to ensure the continuity of this work.

(c) **Ethiopia**. At the request of the Government of Ethiopia, the secretariat has conducted an integrated investment policy (IIP) and ITE review in that country. It was initiated in November 1997 with a programming mission during which the secretariat held consultations with Government officials, representatives from the private sector, science and technology institutions and donors. The Ethiopian Investment Authority and the Ethiopian Science and Technology Commission were initially entrusted with the preparation of the background report. Subsequent to the completion of that report, an evaluation mission consisting of UNCTAD officials and three international experts was carried out in November 1998. The mission focused on the following five sectors identified by the Government as its priority areas: the small- and medium-sized enterprises sector, investment policy coordination, agriculture and the leather industry. The evaluation report is scheduled for completion in June 1999. The final validation meeting presenting the conclusions and recommendations of the review to the Government is scheduled for the summer of 1999.

(d) **United Republic of Tanzania**. An integrated IIP and ITE review has also been initiated in Tanzania at the request of the Government. A first preparatory meeting took place in November 1998. A second visit was planned for April 1999 to review progress in the preparation of the country's background report and identification of the sector-specific policy areas to be addressed by the evaluation team.

(5) In resolution 1997/41, the Council further decided that, subject to the availability of extrabudgetary resources, the secretariat should organize a workshop on the experiences of ITE reviews in different countries. Given that only two reviews were at an advanced stage of implementation during the 1997-1998 inter-sessional period, a workshop at this time would have been of limited usefulness. However, there are certain activities in UNCTAD which might be of interest to the CSTD in this context. UNCTAD has an extensive programme of policy reviews which, in addition to the ITE reviews carried out in relation with IIPA, includes IIP reviews and developing a programme of investment and innovation (IIP) policy reviews. The Commission on Investment, Technology and Related Financial Flows of UNCTAD has decided to review the work programme on country-specific policy reviews during its fourth session in the fall of 1999. The outcome of this review could be used as an input to the ITE workshop called for in Council resolution 1997/41, should the Commission decide to hold it during the forthcoming inter-sessional period.

Gender Advisory Board

15. The Gender Advisory Board was established by CSTD resolution 2/1 for a period of four years on the basis of extrabudgetary resources. Its function was to facilitate future deliberations of the Commission and the follow-up to its recommendations on the gender implications of science and technology for developing countries. In accordance with the resolution, the Board was to report to the Commission at its third and fourth sessions.

17. A report on the 1997-1998 activities of the Board was presented to the Commission at its third session. Among the planned activities of the Board were the establishment of three interactive Regional Board secretariats, one each for South-East Asia, Latin America and Africa. Initial plans had been outlined for the establishment of a first Regional Secretariat in Jakarta as a joint initiative of the Indonesian Institute for Science and the Gender Unit, Paris, at the UNESCO Regional Office. Preliminary plans for the establishment of a Regional Secretariat for the Arab Mediterranean countries were drawn up in 1998, while work on setting up an African secretariat was being planned in 1999.

18. The Board held two meetings during the 1997-1999 inter-sessional period. At their 1998 meeting, it reaffirmed its objective of providing gender input into the Commission through increased substantive interaction among the Commission's members and Bureau through secretariat. It also set up consultative arrangements with interested United Nations offices, specifically with the Division for the Advancement of Women and the United Nations Development Fund for Women (UNIFEM), for the purpose of strengthening coordination and maximizing synergies.

19. With regard to the regional secretariats, a Memorandum of Understanding setting out conditions for approval of the proposal and timetable for payments was to be prepared for the Jakarta office. The proposal for the Montevideo office had to be revised to take into account the remarks of the Board and its expressed concern for the proposed secretariat to develop strong relations with other non-research groups including non-governmental organizations, networks and the private sector. A preliminary proposal still needed to be developed for the African secretariat. Also at the meeting, the Board reiterated its support for the formation and development of national committees on gender issues, and accordingly decided to review the budgets of the regional secretariats in order to allocate more seed monies for the support of such committees.

E/CN.16/1997/2.

10. The third Board meeting was held at York University, Toronto, Canada, 24-26 February 1999. The regional secretariat proposals from Jakarta and Pietermaritzburg were reviewed and adopted pending certain variations. A deadline of 1 May 1999 was set for an African secretariat proposal. National committees and support to them were discussed, with attention paid to where money or other resources could make the strongest impact. Several priorities were set for the next months, including locating of contracts for the Jakarta and Pietermaritzburg secretariats, development of the Gender Science and Technology Policy tool-kits, the creation of a website to provide information on gender science and technology policy issues -- www.genderpp.org -- and the creation of a Canadian national committee.

11. In reviewing the activities of the Gender Advisory Board, two issues require the attention of the CSTD. As mentioned earlier, the Board was created in 1997 for a four-years period. Its mandate therefore expires at the end of 1999, and the CSTD will have to consider whether to renew it. In this connection, it should be pointed out that the work programme of the Board remains to be completed and its budget has not been totally expended. Furthermore, the Government of the Netherlands, which has funded the Board's activities, has been requested to extend the duration of the grant to 30 June 2000, so as to allow the Board to complete the transfer of resources to the regional secretariats and to ensure that they are fully functional. The financing of the Board beyond that time will require additional financial resources.

12. Another issue that needs to be addressed by the CSTD at the event of the renewal of the mandate of the Board is the relation envisaged with the Commission. While CSTD representation on the Board was envisaged from the outset, no modalities have been set for cases in which a representative of a CSTD member State has been replaced or a country ceases to be a CSTD member State. When the Board was established in 1997, the Commission recommended eight individuals[1] to serve as Board members in their personal capacities. Two of these were representatives of CSTD member States, one being also a member of the CSTD Bureau. Since then, these two members of the Gender Advisory Board no longer represent their countries on the CSTD. Thus, since 1998, no CSTD member has been serving on the Gender Advisory Board.

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[1] They were: Dr. Swasti Mitter (Netherlands (CSTD)), Dr. Marita Aanga (Romania), Professor Fatchiyah Kasaah (Egypt), the Hon. Alintie Nyakikya (Uganda), Dr. Shirley Malcolm (United States), Dr. Costa Rousseva (Netherlands), Dr. Geoffrey Oldham (United Kingdom) and Dr. Sonia Cortes (Brazil). Dr. Bonnie Keller (Canada) was appointed by the Board as interim Board Coordinator. Her term of appointment will expire with the appointment of the coordinators of the three regional Board secretariats.

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ROLE AND ACTIVITIES OF THE COMMISSION REGARDING THE COORDINATION OF SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Note by the secretariat

GE.99-50954

1. In line with decision 1997/286 of the Economic and Social Council, the Commission on Science and Technology for Development (CSTD) is to consider, at its fourth session under agenda item 8, the question of the role and activities of the CSTD regarding the coordination of science and technology for development.

2. Since its establishment in 1992, the CSTD has paid particular and continuous attention to the issue of coordination of the activities of the United Nations system in the area of science and technology for development. At its third session, the CSTD reviewed both its own sessional deliberations at the first and second sessions and its inter-sessional activities entailing coordination and co-operation, on the basis of a note prepared by the UNCTAD secretariat (E/CN.16/1997/2). In the course of that review, the CSTD noted that the mandate for the coordination of the activities of the United Nations bodies in the area of science and technology was the responsibility of the Department for Policy Coordination and Sustainable Development (now the Department of Economic and Social Affairs (DESA)). In addition, the functions of the former Joint Inter-Agency Task Force on Science and Technology for Development had been assumed by the existing coordinating bodies under the Administrative Committee on Coordination. The Consultative Committee on Programme and Operations, Questions and the Inter-Agency Committee on Sustainable Development were the two bodies that dealt with issues related to inter-agency coordination in the field of science and technology for development. In this context, the coordinating role of the CSTD mainly consisted of promoting complementary activities, avoiding duplication and liaising with the relevant United Nations organs and agencies as well as other multilateral organizations in carrying out its substantive work during the inter-sessional period.

3. The subject of coordination was also taken up by the Economic and Social Council at its substantive session in July 1998. In its resolution 1998/46, which reconstituted the CSTD, the Council called for the CSTD to establish effective coordination with all other functional commissions, the Economic and Social Council and, in particular, the Commission on Sustainable Development and UNCTAD. The CSTD should also improve and make more effective its coordination with other relevant United Nations bodies, including regional commissions. The recommendations of the Council echoed the decisions taken by the CSTD at its third session, according to which: (a) the secretariat of the CSTD shall be requested to study the possibility of setting up, in collaboration with other United Nations bodies, including regional commissions, an electronic network of their activities in science and technology for development, making the network widely accessible to science and technology institutes around the world; and (b) in order to promote better interaction with United Nations bodies, especially regional commissions, the CSTD shall give consideration to including suitably qualified members of those bodies in its working groups. In addition, meetings of the working groups of the CSTD are to be held in the offices of the regional commissions wherever possible. This note describes the progress made in responding to those decisions.

Building an electronic network

4. The possibility of setting up an electronic network was to be investigated at an inter-agency meeting to discuss technical assistance within the United Nations system in the area of information and communication technology. As it has not been possible to hold this meeting, owing to the lack of resources, the UNCTAD secretariat has taken steps to establish electronic linkages as part of its own dissemination activities.

5. The secretariat has set up a website for all UNCTAD activities, a separate segment of which has been devoted to the CSTD. The website provides information on the membership, mandates, method of work, upcoming meetings and other events of the CSTD, and lists relevant documents with abstracts or executive summaries. In order to enhance the dissemination of system-wide information on science and technology, the secretariat has included links to the websites of other United Nations bodies carrying out activities related to science and technology and has requested them to reciprocate by including a link to the CSTD in their sites.

6. In parallel, the secretariat has been studying the possibility of setting up an interactive information system on technology policy issues and policy-related activities within the United Nations. At its July 1997 meeting, the Executive Committee on Economic and Social Affairs (EC-ESA) designated UNCTAD as the focal point for a sub-group on technology policy issues and policy-oriented activities of entities that are members of EC-ESA. The purpose of the sub-group is to foster cooperation among its members in the area of technology policy. The secretariat suggested that such cooperation could be best achieved through the creation of a system for information exchange and prepared a set of three options for the type of information system that might be established. The EC-ESA, at its eighth meeting in January 1998, chose the option whereby a system would be constructed at the website of a single EC-ESA member, designed in such a way as to permit individual EC-ESA members to maintain their own inputs on the basis of a unified and coordinated architecture and following the same principles of presentation. The Inter-Agency Meeting and Documentation Information System (IAMIS) is the probable location of the main database, and EC-ESA proposed that UNCTAD should undertake discussions with the information systems task force in 1998 on the modalities of setting up the system. The outcome of those discussions, including recommendations for further work, is included in a joint UNCTAD-EC report to be presented at the meeting of IAMIS in 24 March 1999. The CSTD might wish to be informed by the secretariat of the recommendations of EC-ESA, which will be available at the time of the fourth session.

Inter-sessional activities entailing coordination and cooperation

7. The recommendations by the Economic and Social Council were fully taken into consideration by the CSTD in carrying out its inter-sessional activities. Thus, the third meeting of the working group on a common vision, the workshop on the future of science and technology for development and the workshop on the coalition of executives were held in the offices of ECA in Addis Ababa. The ECA secretariat provided logistical support at the meetings and qualified ECA staff members also participated in the meetings.

8. Similarly, the Chairman of the CSTD invited the various United Nations bodies to participate in the working groups on the main and secondary

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The members of EC-ESA are: DESA, the Economic Commission for Africa (ECA), the Economic Commission for Europe (ECE), the Economic Commission for Latin America and the Caribbean (ECLAC), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic and Social Commission for Western Asia (ESCWA), the United Nations Centre for Human Settlements (Habitat), the International Research and Training Institute for the Advancement of Women (INSTRAW), UNCTAD, the United Nations International Drug Control Programme (UNDCP), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Institute for Training and Research (UNITAR), the United Nations Office of Legal Affairs, the United Nations Office at Vienna, the United Nations Research Institute for Social Development (UNRISD) and the United Nations University.

themes. A number of organizations responded positively, appointing focal points to follow the work of the CSTD. In some cases, their representatives participated in the working groups, and made substantive contributions. The Working Group on Science and Technology Partnerships and Networking for National Capacity-Building benefited from substantive inputs provided by representatives from different United Nations departments, regional commissions and agencies such as UNDP, the United Nations University Institute for New Technologies, ESCWA, and the World Health Organization; the Panel on Biotechnology benefited from the participation of the World Bank and UNCTAD's Division on International Trade in Goods and Services and Commodities. The costs of these contributions, in terms of human resources and travel, were borne by the respective organizations.

9. The integrated review on investment policy and on science, technology and innovation policy in Ethiopia benefited from substantive input from the United Nations Industrial Development Organization, which made available an expert to carry out a review of policies for capacity-building in the leather sector.

10. At the same time, the secretariat has been diffusing its own work on science, technology and innovation policy reviews by attending various intergovernmental meetings such as the ESCWA Senior Expert Group meeting on Science and Technology Policies held in Beirut from 10 to 12 March 1999. At this meeting, the secretariat made a substantive contribution to the ongoing discussions on science and technology policies with a presentation of its work on the reviews.